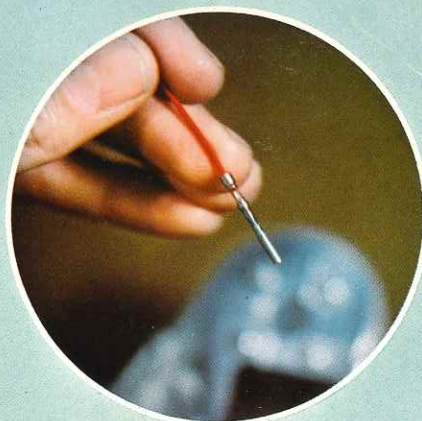
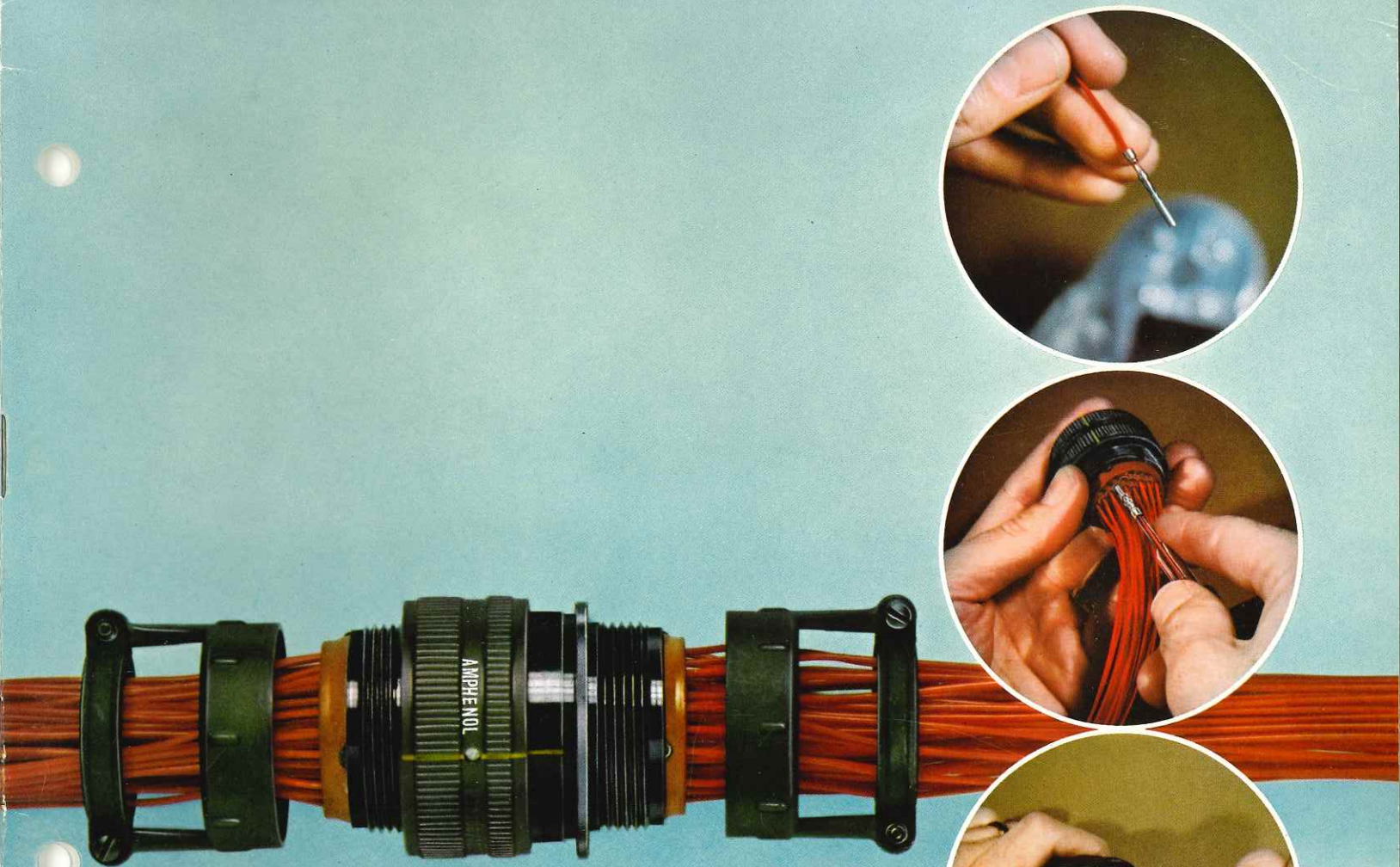




X-26



AMPHENOL 48 Series Application Manual

Rec'd. 9/8/67

MANUAL
ONE



CONTENTS

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48 SERIES

HIGH RELIABILITY, ENVIRONMENT RESISTANT MINIATURE CONNECTORS



48 SERIES

High-Reliability, Environment Resistant, Miniature Connectors

Two versions of 48 Series connectors are available: one meets the requirements of MIL-C-38300; the other meets those of MIL-C-26500. Except for the socket inserts, the two versions are identical. They are completely intermateable.

MIL-C-26500 PERFORMANCE



48 Series

Both mating faces are of AMPHENOL-developed silicone rubber with excellent performance at both high and low temperatures, including resistance to fusing of mated inserts.

MIL-C-38300 PERFORMANCE



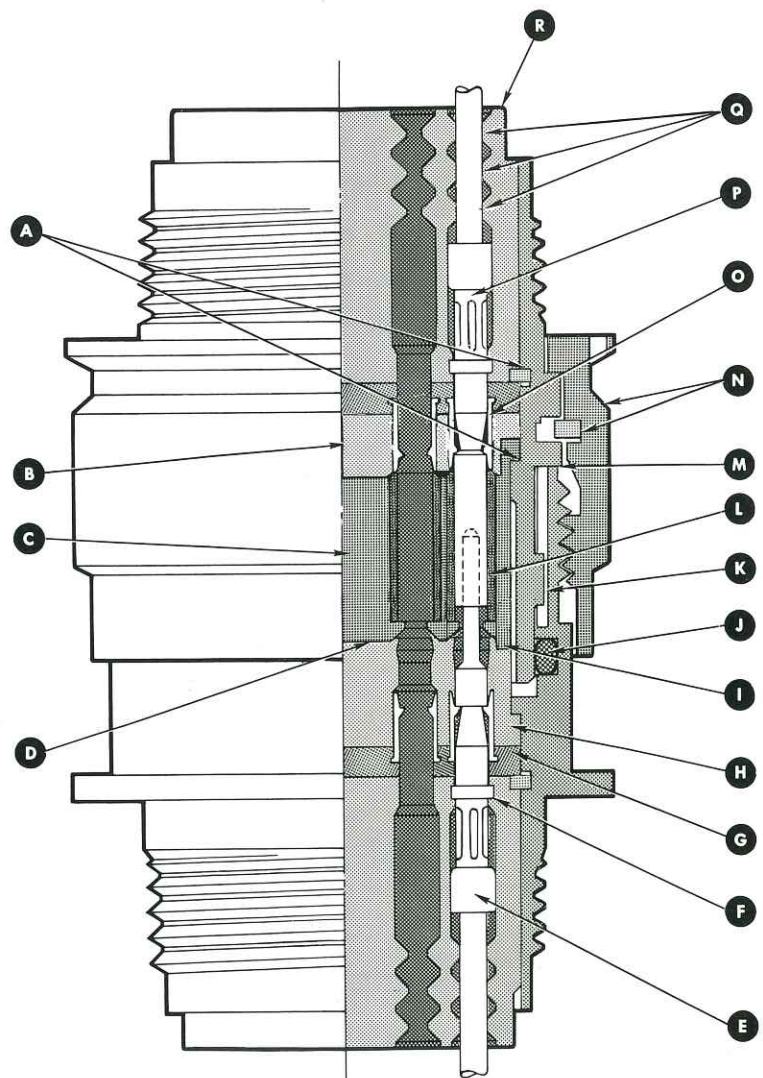
48 Series Ultra-Mate

Identical to other 48 Series connectors, but socket inserts have hard face of glass-filled epoxy. It's the first connector to combine the positive reliability of closed entry with the speed and convenience of front servicing.

FULL PERFORMANCE IN EXTREME ENVIRONMENTS

Advance materials technology and complete environmental sealing enable both the MIL-C-38300 and MIL-C-26500 connectors to:

- Operate continuously at 200°C (392°F)
- Take short exposures up to 427°C (800°F)
- Withstand thermal shock cycling from -55°C (-67°F) to 260°C (500°F)
- Support 1500V RMS from sea level to 350,000 feet
- Maintain environmental and electrical integrity during and after 0 to 2000 CPS vibration, 20 G's. during exposure to 200°C (392°F) and -55°C (-67°F)
- Resist corrosion, ozone, sand and dust



MIL-C-38300 and MIL-C-26500 DESIGN FEATURES

GO/NO-GO RELIABILITY When an Ultra-Mate (MIL-C-38300) connector is mated, there is always proper electrical contact. The hard dielectric socket insert encloses the front of the socket contacts and provides large lead-in chamfers at all holes. If connector pins are slightly misaligned, the chamfered entry guides them in correctly. However, if the pins are badly bent, the hard dielectric presents a closed entry and prevents mating.

FAST FRONT SERVICING The hard-faced Ultra-Mate connector provides a front release system similar to the MIL-C-26500 system, which enables any technician to service it in seconds. Contact positions are clearly marked on the front and rear. Contacts are readily released from the front. During removal, the tool depresses the release sleeve, spreading the tines of the retention clip to release the contact. The tool never touches the retention clip directly and cannot damage it.

TAMPER-PROOF CONTACT RETENTION Wrong-size con-

tacts or over-size test prods cannot be inserted in the hard dielectric entryways to Ultra-Mate contacts. Only the correct tool can get in, and even that has no access to the retention clip. Under normal operating conditions, neither maintenance nor assembly people can tamper with the factory pre-set retention system.

COMPLETE ENVIRONMENTAL SEALING Monoblock construction, with bonded interfaces between the dielectric components (insert, anti-deflection disc, and grommet) eliminates air voids and protects connectors from degrading moisture and altitude conditions. A pressurizing seal around each contact at the major O.D. prevents the passage of air or moisture through the contact hole, and triple sealing riser design at each wire hole in the grommet seals each individual wire.

Amphenol-developed, silicone rubber dielectric provides resilience and unsurpassed resistance to tear, compression set, fluids, and high temperatures. It is used on both



- A. POSITIVE LOCATION CAPTIVATED INSERT (MECHANICAL INTERLOCK)
- B. RESILIENT REAR INSERT
- C. CLOSED ENTRY HARD DIELECTRIC "ULTRAMATE" FRONT INSERT
- D. INSERT STATIC FACE SEAL
- E. PIN CONTACT, MIL-C-26636
- F. CONTACT PRESSURIZING SEAL
- G. ANTI-DEFLECTION DISC
- H. RESILIENT PIN INSERT
- I. INSERT RIM SEAL
- J. DYNAMIC "O" RING SHELL SEAL
- K. FIVE KEY SHELL POLARIZATION
- L. RELEASING SLEEVE
- M. METAL TO METAL SHOULDER
- N. PERMANENT COUPLING CAPTIVATION
- O. CONTACT RETENTION CLIP
- P. SOCKET CONTACT, MIL-C-26636
- Q. WIRE SEALING RISERS
- R. GROMMET

MIL-C-38300 and MIL-C-26500 DESIGN FEATURES

faces of MIL-C-26500 connectors and on the pin insert of MIL-C-38300 connectors. The socket insert of MIL-C-38300 connectors has a hard face of glass-filled epoxy backed by a resilient layer. When the connectors are mated, the silicone rubber insert face compresses to form a resilient dielectric seal around each individual contact. A continuous barrier on the periphery of the socket insert mates with a recess around the pin insert to form an additional static seal. Together with monoblock construction, this puts void-free, continuous dielectric around each contact through the entire connector length. A dynamic "O" ring seal between mated shells constitutes still another barrier to dirt and moisture, and protects the integrity of the face seals.

LIGHT WEIGHT AND HIGH CONTACT DENSITY Connector shells are impact-extruded aluminum forgings with a high strength-to-weight ratio. The insert arrangement is designed for the maximum number of contacts within the area available.

MIL-C-26636 CONTACTS Poke Home® contacts (front releasable, rear insertable) provide for easy servicing of connector circuits without disassembling the connector from its mounting or disturbing adjacent contacts. MIL-C-26636 contacts are crimped quickly, consistently and reliably with either hand or power tools. They have high electrical conductivity, present a smooth configuration, and are hooded to protect electrical contact pressure-members from environmental and handling damage. The contacts come in sizes 20, 16, 12 and shielded, with rhodium-over-silver plating. (Other platings such as gold are available.)

AMPHENOL SILICONE RUBBER An important factor in meeting high temperature requirements is the fusion-resistant silicone rubber developed by AMPHENOL for use as the insert dielectric. Besides meeting the 200°C requirement, this insert material has other advanced properties and out-performs such materials as neoprene rubber.



AMPHENOL

CONNECTOR CONSTRUCTIONS



Threaded
Plug
48-06RXX-XXX



Threaded
Square Flange Receptacle
48-00RXX-XXX



Threaded
Single Hole
Mounting Receptacle
48-03RXX-XXX



Bayonet
Plug
48-16RXX-XXX



Bayonet
Square Flange Receptacle
4810RXX-XXX



Bayonet
Single Hole
Mounting Receptacle
48-13RXX-XXX

ALTERNATE SHELL POSITIONS

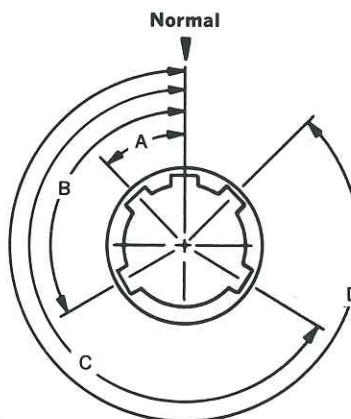
For Connectors Size 8 and 10

Position	A	B	C	D
Normal	105°	140°	215°	265°
6	102°	132°	248°	320°
7	80°	118°	230°	312°
8	35°	140°	205°	275°
9	64°	155°	234°	304°
*10	25°	115°	220°	270°

*Position 10 not available in size 8 connector

For Connectors Size 12, 14, 16, 18, and 22

Position	A	B	C	D
Normal	105°	140°	215°	265°
6	18°	149°	192°	259°
7	92°	152°	222°	342°
8	84°	152°	204°	334°
9	24°	135°	199°	240°
10	98°	152°	268°	338°



Front face of receptacle shown

Note: Alternate positions 6 through 10 incorporate special shell polarizing key and keyways. All inserts remain in the normal position.



POKE HOME® CONTACTS AND SEALING PLUGS

When you order 48 or 217 Series connectors with contacts, the contact package contains an extra 10% spares (or at least 3 extra contacts). The package also includes 15% as many sealing plugs as contacts (or at least 5 sealing plugs).

To order contacts and sealing plugs separately use the part numbers in the table below. They are applicable to both 48 and 217 Series. (The contacts, of course, are MIL-C-26636 contacts.) Contacts may also be ordered in reels for use with automatic crimping tools.



MIL-C-26636 Contacts



Contact Data

Contact Size	Max. Current Rating	Wire Size	AMPHENOL Part No.		MS Part No.	
			Pin	Socket	Pin	Socket
No. 20	7.5 amps	24-22-20 AWG	48-1595-02	48-100-2000S-02	MS24254-20P	MS24255-20S
No. 16	22 amps	18-16 AWG	48-1825-02	48-100-1600S-02	MS24254-16P	MS24255-16S
No. 12	41 amps	14-12 AWG	48-1827-02	48-1215-02	MS24254-12P	MS24255-12S
No. 1 (shielded)*						
Resilient	3 amps	* *	48-1226-02	48-1227-02	MS27184-22P	MS27185-22S
Hard Front	3 amps	* *	—	48-1227-50	—	MS27450-22S
No. 2 (shielded)						
Resilient	7.5 amps	* * *	48-2187-02	48-2188-02	MS27184-20P	MS27185-20S
Hard Front	1 amp	RG-195/U	48-2187-50	48-2188-50	—	—

*Replaces No. 12 power contact.

Can accommodate cables RG179/U, RG179A/U, RG187/U, RG188/U and RG161/U as well as shielded contacts.

Cables RG195/U, RG178/U, RG178A/U and RG196/U can also be accommodated with modification to shielded contacts.

**Cable MIL-C-27500-22KIN6 (Extruded) or 22 AWG per MIL-C-7078 type II.

***Cable MIL-C-27500-22KIN6; 20KIN6; 18KIN6 (Extruded) or 22, 20, 18 AWG per MIL-C-7078 type II.

GROMMET SEALING PLUGS

Color Code	Size	AMPHENOL Part No.	MS Part Number
Yellow	12	48-2221-12	MS27187-2
Blue	16	48-2221-16	MS27187-1
Red	20	48-2221-20	MS27186-1
White	#2 Shielded	48-1458	MS25251-8

POKE-HOME CONTACT INSERTION AND REMOVAL TOOLS



MIL-C-26500
MIL-C-28300
Insertion Tool



MIL-C-26500
Removal Tool



MIL-C-38300
Ultra-Mate
Removal Tool

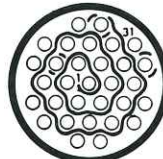
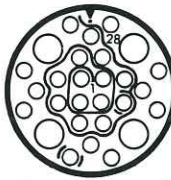
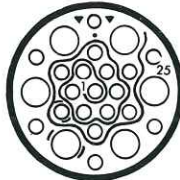
Insertion Tool Part No.			Removal Tool Part No.			Ultra-Mate Contact Removal Tool		
AMPHENOL	MS	Contact Size	AMPHENOL	MS	Contact Size	MS	AMPHENOL Part No.	
294-88	24256A-20	#20	294-89	24256R-20	#20	24256RH-20		294-203
294-96	24256A-16	#16	294-97	24256R-16	#16	24256RH-16		294-180
294-72	24256A-12	#12, #1 Shielded	294-73	24256R-12	#12, #1 Shielded	—		294-183
294-128	—	#2 Shielded	294-127	—	#2 Shielded	—		294-184
					#20 Full Cycle Tool	—		294-185



AMPHENOL

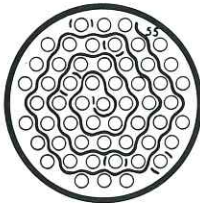
Inserts Available

(Showing front face of socket insert)

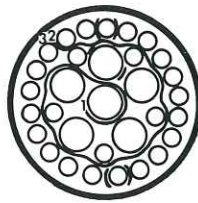
SHELL SIZE—8  2 #20 contacts Insert 8-2	SHELL SIZE—10 MS-24260  5 #20 contacts Insert 10-5*  2 #20 contacts Insert 10-2**  2 #16 contacts Insert 10-20	SHELL SIZE—12 MS-24260  12 #20 contacts Insert 12-12*  3 #16 contacts Insert 12-3
SHELL SIZE—14 MS-24260  15 #20 contacts Insert 14-15*  9 #20 contacts 3 #16 contacts Insert 14-12**  7 #16 contacts Insert 14-7*  4 #12 contacts Insert 14-4  2 #16 contacts 1 #2 contact Insert 14-3		SHELL SIZE—16 MS-24261  24 #20 contacts Insert 16-24*  10 #16 contacts Insert 16-10**
SHELL SIZE—18 MS-24262  31 #20 contacts Insert 18-31*  14 #16 contacts Insert 18-14  10 #16 contacts 1 #2 contact Insert 18-11  8 #12 contacts Insert 18-8		
SHELL SIZE—20  41 #20 contacts Insert 20-41* **  37 #20 contacts 2 #16 contacts Insert 20-39**  24 #20 contacts 4 #12 contacts Insert 20-28**  19 #20 contacts 6 #12 contacts Insert 20-25**  16 #16 contacts Insert 20-16**		



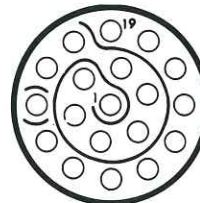
SHELL SIZE—22
MS-24263



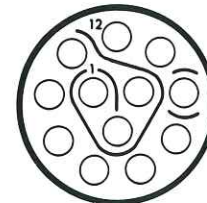
55 #20 contacts
Insert 22-55*



26 #20 contacts
6 #12 contacts
Insert 22-32**

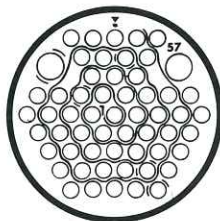


19 #16 contacts
Insert 22-19*

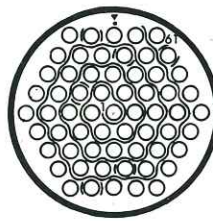


12 #12 contacts
Insert 22-12

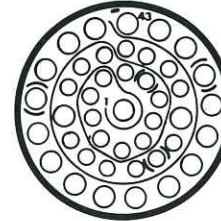
SHELL SIZE—24



2 #16 contacts
55 #20 contacts
Insert 24-57**



61 #20 contacts
Insert 24-61* **



23 #20 contacts
20 #16 contacts
Insert 24-43**

*Available with hard-dielectric face socket inserts for Ultra-Mate (MIL-C-38300) connectors. Pin inserts for MIL-C-38300 connectors have a resilient face and, except for marking, are identical to MIL-C-26500 pin inserts.

**Not included in MS-2426X at time of printing.

Specifications

Contact Size	Rated Amps.	for AWG Wire Size	Insulation Max.	O. D. Min.
20	7.5	24-22-20	.090	.040
16	20	18-16	.130	.064
12	35	14-12	.170	.106
#1 Shielded	3	Shielded Cable #22		
#2 Shielded	7.5	Shielded Cable Size 20 per MIL C-7078, type II		

**DERATED CURRENT RATINGS
AT CONTINUOUS OPERATION
FOR CONTACTS OF #52 ALLOY**

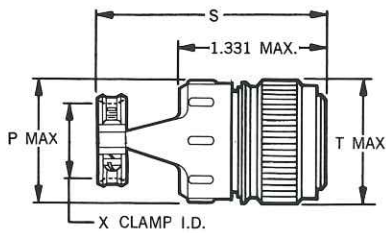
Contact Size	Amps
#12	20
#16	10
#20	5



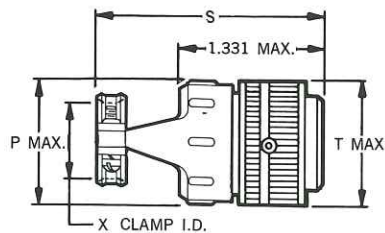
AMPHENOL

DIMENSIONS

PLUGS



THREADED PLUG
48-06RXX-XXX
MS24266RXXT-XXX

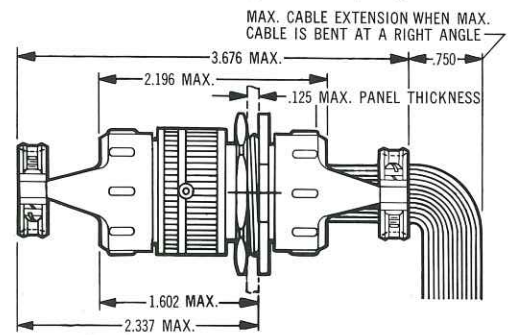


BAYONET PLUG
48-16RXX-XXX
MS24266RXXB-XXX

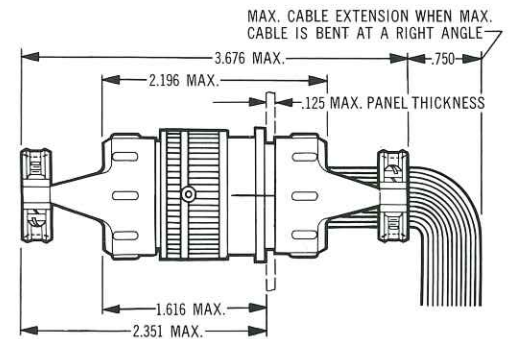
Shell Size	P Max. Thrd. & Bay.	T Max.* Thrd.	Bay.	X ±.015	S
8	.440	—	.750	—	1.832
10	.731	.836	.906	.270	1.832
12	.919	1.025	1.078	.400	1.832
14	.981	1.125	1.141	.460	2.067
16	1.106	1.250	1.265	.610	2.067
18	1.231	1.375	1.375	.690	2.067
20	1.356	1.508	1.508	.830	2.067
22	1.481	1.625	1.625	.940	2.067
24	1.606	1.758	1.758	1.040	2.067

MATED PAIRS

Threaded or Bayonet Coupling

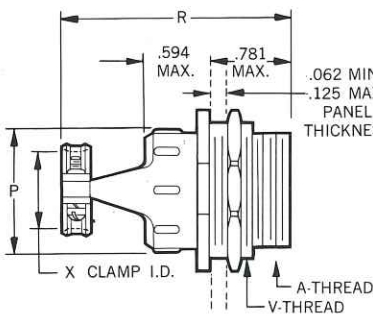


Single Hole Mounting Receptacle and Straight Plug

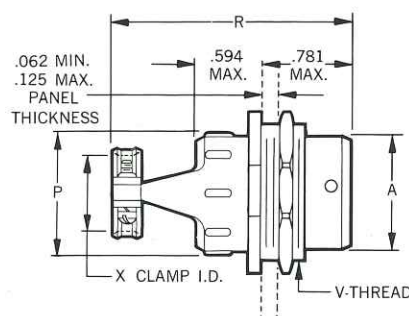


Square Flange Receptacle and Straight Plug

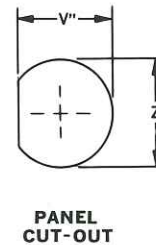
SINGLE HOLE MOUNTING RECEPTACLES



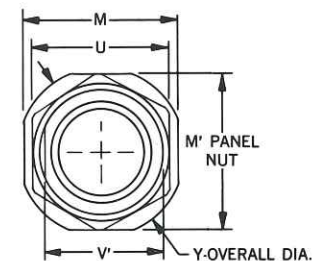
THREADED RECEPTACLE
48-03RXX-XXX
MS24265RXXT-XXX



BAYONET RECEPTACLE
48-13RXX-XXX
MS24265RXXB-XXX



PANEL CUT-OUT



FLANGE AND NUT

BOTH THREADED AND BAYONET RECEPTACLES

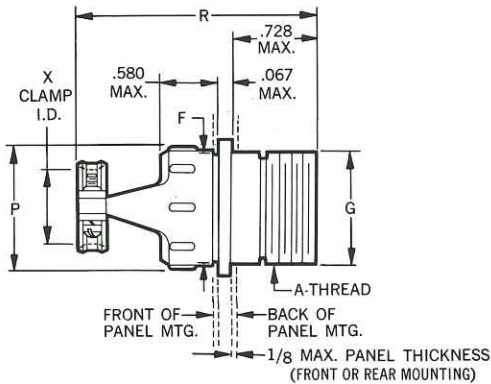
Shell Size	A Th'd	A +.000 — .003	M Max.	M' Max.	P Max.*	U Max.	V Th'd	V' ±.003	V'' ±.005	X ±.015	Y Max.	Z ±.005	R Max.
10	11/16-24	.659	1.109	1.075	.731	.953	3/4-20	.718	.730	.270	1.192	.760	1.890
12	7/8-20	.829	1.296	1.292	.919	1.140	15/16-20	.905	.917	.400	1.380	.947	1.890
14	15/16-20	.898	1.396	1.396	.981	1.205	1-20	.968	.980	.460	1.505	1.010	2.125
16	1 1/16-18	1.025	1.521	1.521	1.106	1.329	1 1/8-20	1.093	1.105	.610	1.630	1.135	2.125
18	1 3/16-18	1.131	1.646	1.646	1.231	1.455	1 1/4-20	1.217	1.225	.690	1.740	1.260	2.125
20	1 5/16-18	1.256	1.771	1.771	1.356	1.630	1 3/8-18	1.342	1.350	.830	1.860	1.385	2.125
22	1 7/16-18	1.381	1.959	1.959	1.481	1.705	1 1/2-20	1.467	1.475	.940	2.040	1.510	2.125
24	1 9/16-18	1.506	2.084	2.084	1.606	1.817	1 5/8-18	1.592	1.600	1.040	2.160	1.635	2.125

*See cable support dimensions on page 17.

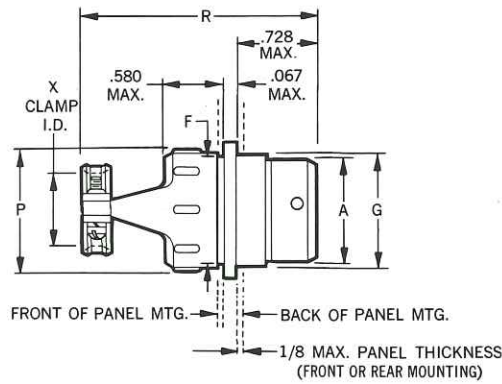


DIMENSIONS

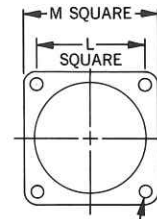
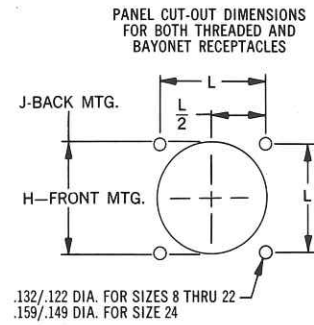
SQUARE FLANGE RECEPTACLES



THREADED RECEPTACLE
48-00RXX-XXX
MS24264RXXT-XXX



BAYONET RECEPTACLE
48-10RXX-XXX
MS24264RXXB-XXX



Shell Size	A Th'd	A ±.000 ±.005	F Max.	G Max.	H Min.	J Min.	L ±.005	M ±.005	P Max.	X ±.015	R Max.
8	—	.536	.437	.561	.447	.620	.594	.812	—	—	1.890
10	11/16-24	.659	.562	.696	.572	.748	.719	.937	.731	.270	1.890
12	7/8-20	.829	.750	.875	.760	.913	.812	1.031	.919	.400	1.890
14	15/16-20	.898	.812	.935	.822	.980	.906	1.125	.981	.460	2.125
16	1 1/16-18	1.025	.938	1.062	.948	1.107	.969	1.250	1.106	.610	2.125
18	1 3/16-18	1.131	1.062	1.187	1.072	1.209	1.062	1.343	1.231	.690	2.125
20	1 5/16-18	1.256	1.182	1.312	1.192	1.337	1.156	1.437	1.356	.830	2.125
22	1 7/16-18	1.381	1.312	1.437	1.322	1.452	1.250	1.562	1.481	.940	2.125
24	1 9/16-18	1.506	1.432	1.562	1.442	1.577	1.375	1.703	1.606	1.040	2.125

AMPHENOL
Part No. Insert Arrangement

REDUCED FLANGE

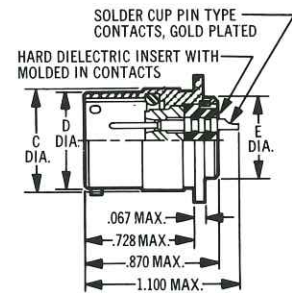
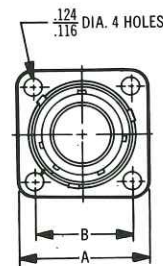
48-7132-xx	10-5
48-7133-xx	12-3
48-7134-xx	12-12

STANDARD FLANGE

48-7115-xx	10-5
48-7116-xx	12-3
48-7117-xx	12-12
48-7118-xx	14-4
48-7119-xx	14-7
48-7120-xx	14-15
48-7121-xx	16-24
48-7122-xx	18-8
48-7123-xx	18-14
48-7124-xx	18-31
48-7125-xx	21-12
48-7126-xx	22-19
48-7127-xx	22-55

-xx Alternate keying position—omit for standard position

SHORT SKIRT RECEPTACLES



DIMENSIONS WITH REDUCED FLANGE

(Dimensions with standard flange are same as on regular receptacle.)

Insert Arrangement	A Max.	B ±.005	C Max.	D +.000 -.005	E Max.
10-5	.870	.647	.696	.659	.562
12-3 and 12-12	.996	.773	.875	.829	.750

Shorter, lighter, and more economical—that's how the short skirt receptacles compare with the standard receptacles in the 48 Series. They have diallyl phthalate inserts and can operate continuously up to 125°C (257°F), but otherwise they offer the same environmental sealing from the panel out as standard 48 Series connectors. The short skirt receptacles come in two versions: with standard flange and with reduced flange. Both versions are 1.100" long, or .275" shorter than the standard. They have bayonet coupling and mate with standard 48 Series plugs. The hard dielectric inserts, with resilient face seal and molded-in, gold plated solder cup pin contacts, are available in the arrangements shown.



AMPHENOL

HERMETICALLY SEALED RECEPTACLES

Hermetically sealed receptacles in the 48 Series have a leakage rate of less than .01 micron cubic foot of helium per hour with one atmosphere differential. To simplify contact identification, AMPHENOL puts contact spiral markings on the glass dielectric as well as on the face seal. It uses its exclusive Identoseal process to mark the glass.

The receptacles are available with either threaded or bayonet coupling in either of two shell styles: solder

flange or single hole hex nut mounting shells. They take most of the 48 Series pin inserts shown on pages 14 and 15. The part numbers to use in ordering are shown in the table on page 8.

The shells are non-magnetic stainless steel. The contacts are made of 52 alloy and are rhodium plated, flattened and pierced. Solder cups are furnished when you order deviation (108).

SOLDER FLANGE HERMETIC RECEPTACLES

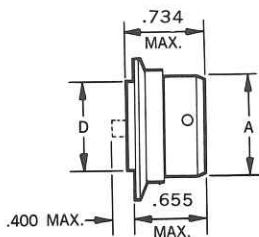


Bayonet

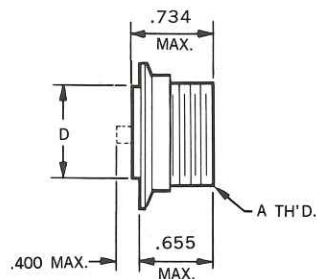


Threaded

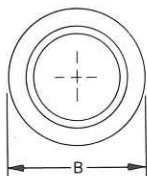
DIMENSIONS (Inches)



48-15HXX XXP
MS27034HX XBXXP



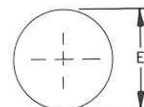
48-05HXX XXP
MS27034HXXT XXP



FLANGE
Both threaded
and bayonet
receptacles

Dimensions (Inches)

Shell Size	A $\pm .004$ — .000	A Th'd	B Max.	D Max.	$\pm .010$ — .000 E
10	.659	$1\frac{1}{16}$ -24	.860	.557	.567
12	.829	$\frac{7}{8}$ -20	1.005	.745	.755
14	.898	$1\frac{5}{16}$ -20	1.110	.807	.817
16	1.025	$1\frac{1}{16}$ -18	1.230	.933	.942
18	1.131	$1\frac{3}{16}$ -18	1.360	1.057	1.067
22	1.381	$1\frac{7}{16}$ -18	1.610	1.307	1.317



PANEL CUTOUT
Both threaded
and bayonet
receptacles

Write factory for information on sizes 8, 20 and 24.



SINGLE HOLE MOUNTING HERMETIC RECEPTACLES

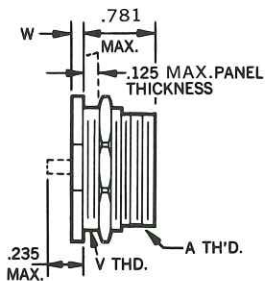


Threaded

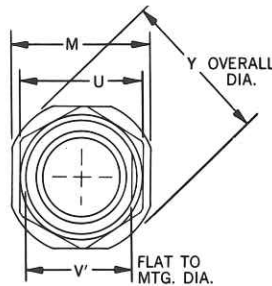


Bayonet

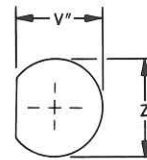
DIMENSIONS (INCHES)



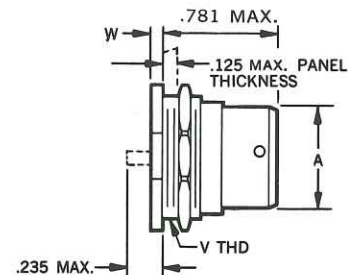
48-03HXX XXX
MS24265HXXT XXX



FLANGE AND NUT



PANEL CUT-OUT



48-13HXX XXX
MS24265HXXB XXX

BOTH THREADED AND BAYONET RECEPTACLES

Dimensions (Inches)										
Shell Size	A $\pm .000$ — .005	A Th'd	Y Max.	M Max.	U Max.	V Th'd	V' $\pm .003$	V'' $\pm .005$	W Max.	Z $\pm .005$
10	.659	1 $\frac{1}{16}$ -24	1.192	1.109	.953	3/4-20	.718	.730	.137	.760
12	.829	7/8-20	1.380	1.296	1.140	1 $\frac{1}{16}$ -20	.905	.917	.137	.947
14	.898	1 $\frac{5}{16}$ -20	1.505	1.396	1.205	1-20	.968	.980	.137	1.010
16	1.025	1 $\frac{1}{2}$ -18	1.630	1.521	1.329	1 $\frac{1}{8}$ -20	1.093	1.105	.137	1.135
18	1.131	1 $\frac{3}{4}$ -18	1.740	1.646	1.455	1 $\frac{1}{4}$ -20	1.217	1.225	.137	1.260
22	1.381	1 $\frac{7}{8}$ -18	2.040	1.959	1.705	1 $\frac{1}{2}$ -20	1.467	1.475	.168	1.510

Write factory for information on sizes 20 and 24.

48-7005 HERMETICALLY SEALED RECEPTACLE



- Hermetically sealed, feed-through connector.
- Has two #16 pin contacts, one shielded pin contact.
- Has bayonet coupling, mates with 48-16R14-3S or 48-16R14-2/1S.
- Offers all features of MIL-C-26500B(USAF), including continuous operation at 200°C; interfacial insert seal, insert rim seal, and dynamic O ring between shells; visual full engagement indicators for mating; and five polarizing keys in alternate positions to prevent mismatching.



AMPHENOL

ACCESSORIES

CAPS AND CHAINS

Protective metal caps provide an environmental seal for the connector face. They exclude dirt, dust, moisture, and other foreign materials from the face of unmated plugs and receptacles. The caps have a woven steel strap so they can be easily attached near their point of use.

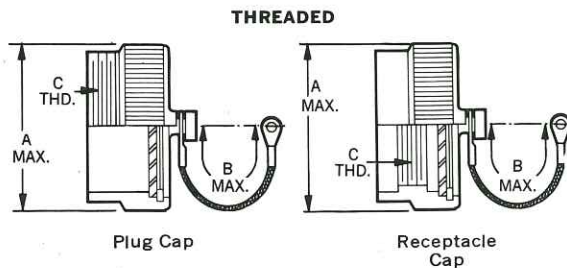
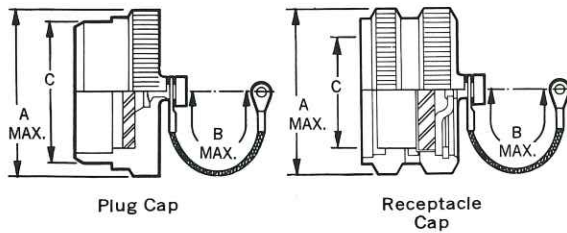
ORDERING INFORMATION

		Part Numbers			
	Size	PLUG		RECEPTACLE	
		AMPHENOL	MS	AMPHENOL	MS
BAYONET CAP & CHAIN	10	48-2144	MS27293-1	48-2150	MS27295-1
	12	48-2143	MS27293-2	48-2149	MS27295-2
	14	48-2142	MS27293-3	48-2148	MS27295-3
	16	48-2141	MS27293-4	48-2147	MS27295-4
	18	48-2140	MS27293-5	48-2146	MS27295-5
	20	48-2773	—	48-2774	—
	22	48-2139	MS27293-6	48-2145	MS27295-6
	24	48-2767	—	48-2768	—
THREADED CAP & CHAIN	10	48-2340-10	MS27292-1	48-2301-10	MS27294-1
	12	48-2340-12	MS27292-2	48-2301-12	MS27294-2
	14	48-2340-14	MS27292-3	48-2301-14	MS27294-3
	16	48-2340-16	MS27292-4	48-2301-16	MS27294-4
	18	48-2340-18	MS27292-5	48-2301-18	MS27294-5
	20	48-2340-20	—	48-2301-20	—
	22	48-2340-22	MS27292-6	48-2301-22	MS27294-6
	24	48-2340-24	—	48-2301-24	—



BAYONET

DIMENSIONS (Inches)



Size	A Max. Dia.	B Chain Length	Bayonet Cap and Chain C		Threaded Cap and Chain C—Coupling Thread	
			Plug Cap +.000 -.005	Receptacle Cap +.005 -.000	Plug UNEF-2A	Receptacle UNEF-2B
10	.906	3.00	.659	.662	1 $\frac{1}{16}$ -24	1 $\frac{1}{16}$ -24
12	1.078	3.00	.829	.832	$\frac{7}{8}$ -20	$\frac{7}{8}$ -20
14	1.141	5.00	.898	.901	1 $\frac{5}{16}$ -20	1 $\frac{5}{16}$ -20
16	1.266	5.00	1.025	1.028	1 $\frac{1}{2}$ -18	1 $\frac{1}{2}$ -18
18	1.375	5.00	1.131	1.134	1 $\frac{3}{16}$ -18	1 $\frac{3}{16}$ -18
20	1.508	5.00	1.256	1.263	—	—
22	1.625	5.00	1.381	1.384	1 $\frac{7}{16}$ -18	1 $\frac{7}{16}$ -18
24	1.758	5.00	1.506	1.513	—	—



DUMMY RECEPTACLES

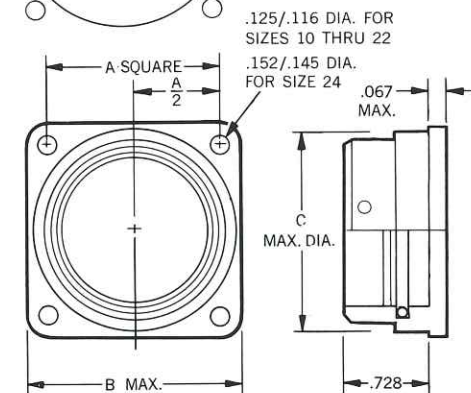
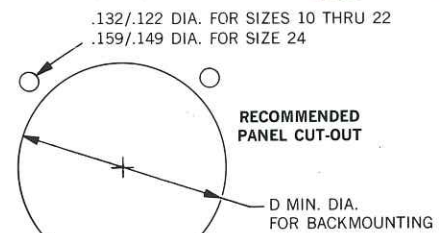
Dummy receptacles are used as an anchoring place for disconnected plugs. They eliminate the problems involved in letting plugs swing freely. They also provide a limited air seal and prevent accumulation of foreign material on the face of the plug.

ORDERING INFORMATION

Size	BAYONET		Part Numbers		THREADED	
	AMPHENOL	MS	AMPHENOL	MS	AMPHENOL	MS
10	48-149-10000	MS27297-1	48-172-10000	MS27296-1		
12	48-149-12000	MS27297-2	48-172-12000	MS27296-2		
14	48-149-14000	MS27297-3	48-172-14000	MS27296-3		
16	48-149-16000	MS27297-4	48-172-16000	MS27296-4		
18	48-149-18000	MS27297-5	48-172-18000	MS27296-5		
20	48-149-20000	—	48-172-20000	—		
22	48-149-22000	MS27297-6	48-172-22000	MS27296-6		
24	48-149-24000	—	48-172-24000	—		

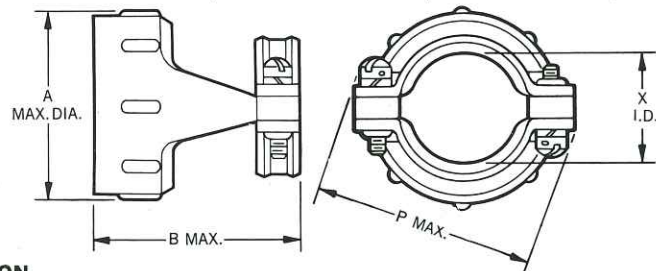
DIMENSIONS (Inches) (Same for bayonet and threaded receptacles)

Size	Threaded Size UNEF-2A	A ±.005 Square	B ±.005	C Max. Dia.	D Min. Dia.
10	1 $\frac{1}{16}$ -24	.719	.937	.696	.748
12	$\frac{7}{8}$ -20	.812	1.031	.875	.913
14	1 $\frac{5}{16}$ -18	.906	1.125	.935	.980
16	1 $\frac{1}{2}$ -18	.969	1.250	1.062	1.107
18	1 $\frac{3}{4}$ -18	1.062	1.343	1.187	1.209
20	—	1.156	1.442	1.312	1.337
22	1 $\frac{7}{8}$ -18	1.250	1.562	1.437	1.452
24	—	1.375	1.708	1.562	1.577



CABLE SUPPORT ASSEMBLY

Cable clamps support cable or wire at the plug or receptacle and prevent twisting and pulling.



ORDERING INFORMATION

Size	Part Numbers		Dimensions (Inches)				
	AMPHENOL	MS	A Max. Dia.	B ±.015	X I.D. ±.015	E Thread UNEF-2B	P Max.
10	48-2341	MS27291-1	.731	.935	.270	$\frac{9}{16}$ -24	.914
12	48-2342	MS27291-2	.919	.935	.400	$\frac{3}{4}$ -20	1.026
14	48-2343	MS27291-3	.981	1.170	.460	1 $\frac{1}{8}$ -20	1.090
16	48-2344	MS27291-4	1.106	1.170	.610	1 $\frac{5}{16}$ -20	1.250
18	48-2345	MS27291-5	1.231	1.170	.690	1 $\frac{1}{2}$ -18	1.358
20	48-2643	—	1.356	1.170	.830	1 $\frac{3}{4}$ -18	1.496
22	48-2346	MS27291-6	1.481	1.170	.940	1 $\frac{3}{4}$ -18	1.604
24	48-2644	—	1.606	1.170	1.040	1 $\frac{7}{8}$ -18	1.740



AMPHENOL

ASSEMBLY PROCEDURES

POKE HOME® CONTACT CRIMPING

SPEED—Crimping is a fast 1-2-3 process: insert contact, insert wire, close tool—and the contact termination is complete. That's why the hand tool gives up to 400 terminations an hour. Pneumatically-operated tools, with cartridge or reel-fed contacts, eliminate the contact insertion step and increase the yield to 600-800 terminations per hour.

CONSISTENT QUALITY—The preset crimping tool automatically controls crimp depth and eliminates the possibility of over-crimping or under-crimping.

DEPENDABLE INSPECTION—Once the crimping tool is inspected for proper setting, it consistently provides identical production terminations. Visual inspection through the contact inspection hole immediately verifies proper wire insertion.

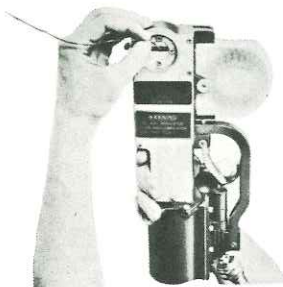
HIGH HOLDING POWER—AMPHENOL's four-indent crimp provides such excellent wire confinement that

high pull-out forces exceed the minimums specified in MIL-T-22520A.

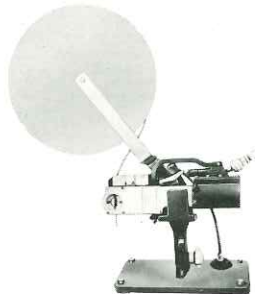
EASY TERMINATION ACCESSIBILITY—Problems of closely spaced contacts and close quarters are minimized, because contacts can be crimped to leads, *then* inserted in connectors. Explosive atmosphere and lack of electric power—bugaboos of soldering—are no problems, because the hand tool needs no power and creates no hazard.

HIGH TEMPERATURE RANGE—Crimp terminations can be used in high-temperature applications where solder might soften or melt.

MINIMUM OPERATOR TRAINING—It takes only a few minutes to show the simple steps to a new operator and make sure he can do the job.



Amphenol No. 294-605
Pneumatically-operated,
manual-feed crimping tool.



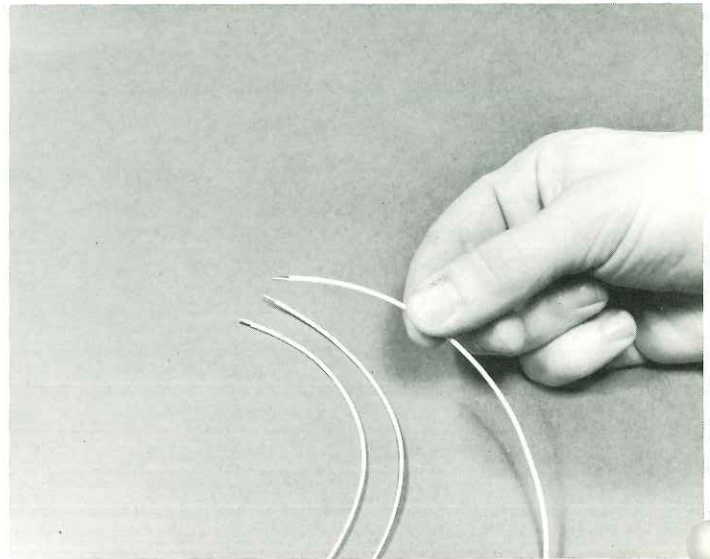
Amphenol No. 294-506
Pneumatically-operated,
automatic-feed crimping tool.



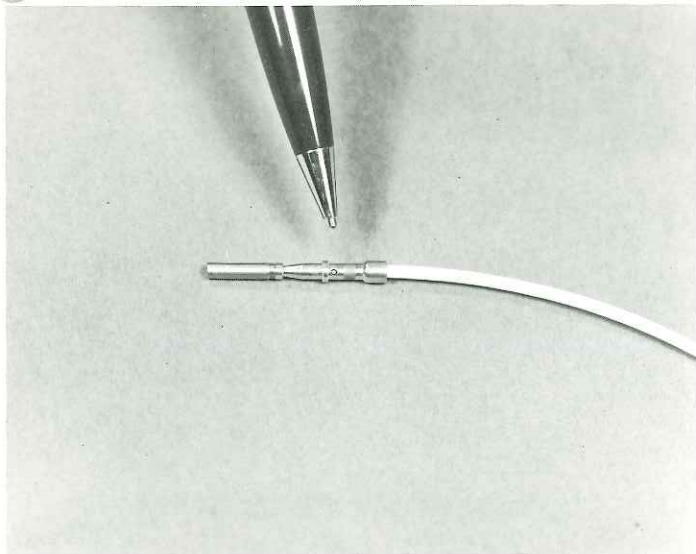
MS No. MS 3191-1
Amphenol No. 294-126
Manually-operated,
full-cycle crimping tool.



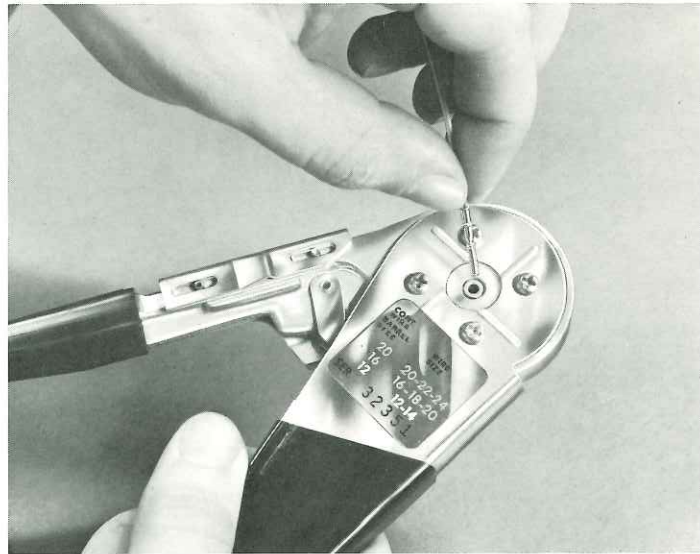
Insert proper positioner in hand tool 294-126. (Follow color code in table on page 15.)



Strip wires to lengths shown in table, page 15. Be careful not to cut or gall wire strands or insulation. If ends fray, twist them back to their original lay.



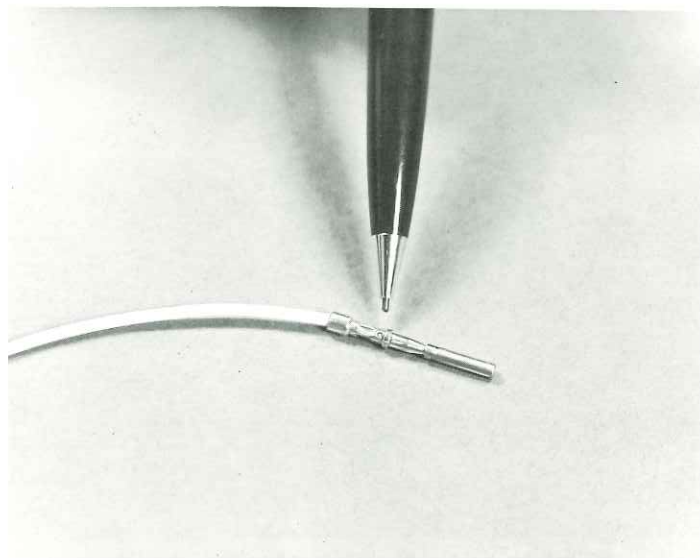
Insert stripped wire into contact pocket until it is visible through inspection hole.



Fully seat contact in crimp tool positioner.



Crimp in one full stroke. (The ratchet will not release jaws until tool has completed stroke.)



Inspect crimp for wire visibility through inspection hole.

COLOR CODING

Contact Size	Color Code	Wire Size	Insulation O. D.	Stripping Lengths
20	Red	20-22-24 AWG	.040/.090"	.187/.234"
16	Blue	18-16 AWG	.068/.130"	.220/.260"
12	Yellow	14-12 AWG	.106/.170"	.220/.260"



AMPHENOL

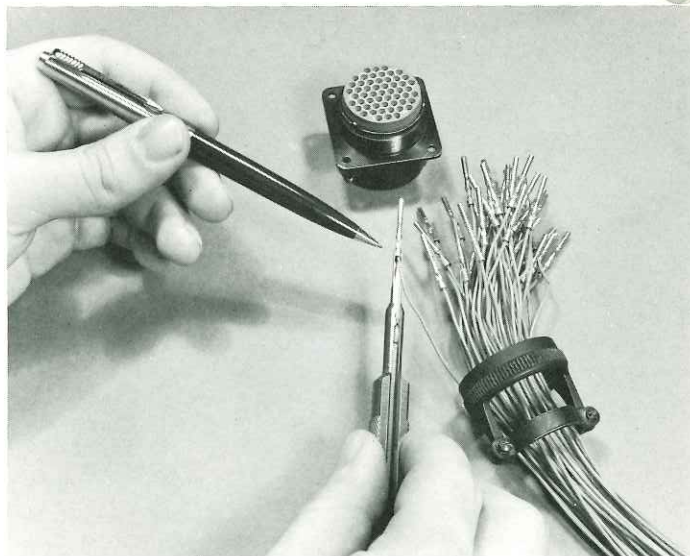
ASSEMBLY PROCEDURES

INSERTING POKE HOME CONTACTS

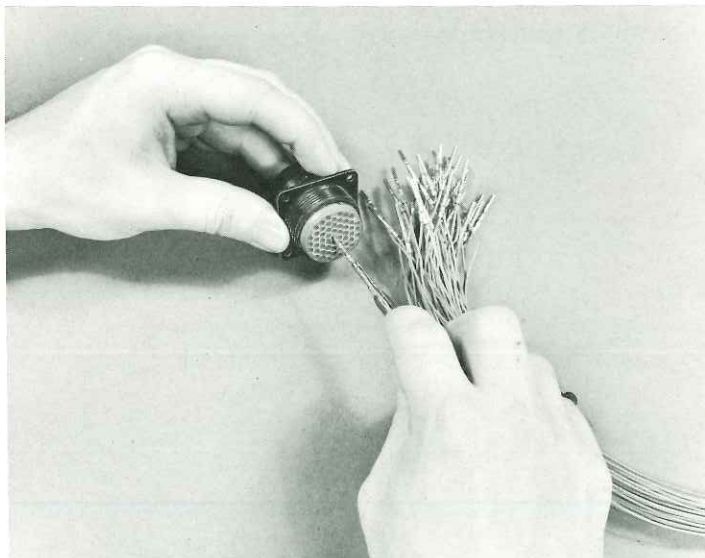


Insertion Tool

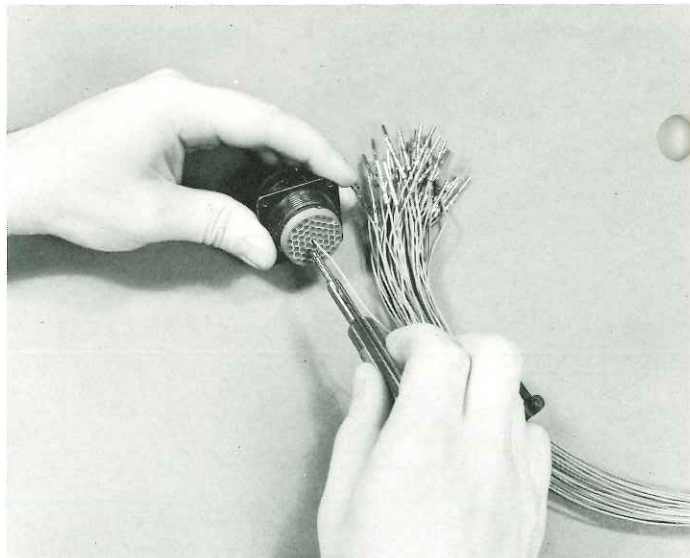
Select proper insertion tool from table below for the size of contact. The insertion tool and procedure are the same for both pin and socket contacts.



Slide cable support back over wire bundle. Lay wire in groove of insertion tool and slide contact into front of tool until it is properly located in tool probe.



Holding tool and contact at right angles to the grommet face, place contact into the proper hole in the back of the connector. Keep contact and tool centered in the hole and apply a smooth, even axial push on the tool until the contact is fully seated. The contact is in position when the visual indicator ring on the tool enters the grommet.



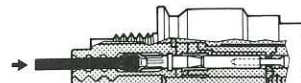
Withdraw tool at right angles to the grommet face until it is completely free of the connector.

INSERTION TOOLS

Contact Size	Color Code	Part Number	
		Amphenol	MS
20	Red	294-88	24256A-20
16	Blue	294-96	24256A-16
12	Yellow	294-72	24256A-12
Shielded No. 1	Yellow	294-72	24256A-12
Shielded No. 2	Green	294-128	Unassigned



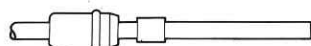
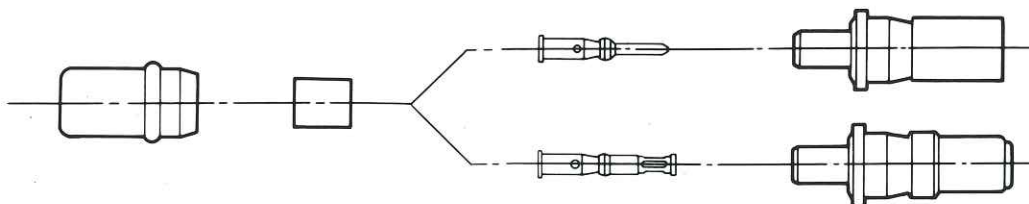
Insert the center contact (numbered 1) first, then those toward the outer contact positions, following the pattern of the contact number sequence. (Every tenth contact hole is identified by parentheses around it.)



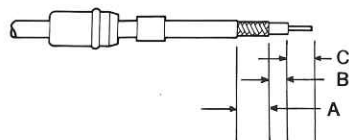
Insert an unwired contact in each unused hole, then fill the hole behind it with a sealing plug. Push the sealing plug in by hand until it is fully seated.



ASSEMBLY PROCEDURES **CRIMPING & INSERTING SHIELDED CONTACTS**



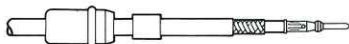
Slide sealing boot and slide outer ferrule onto cable as shown.



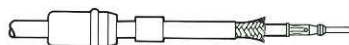
Strip cable jacket, braid, and dielectric to the dimensions shown in the table below. Make all cuts square and sharp, being careful not to nick braid, dielectric, or center conductor when cutting. If conductor ends fray, twist them to their normal lay.

SHIELDED CONTACT CRIMPING

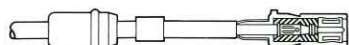
Shielded Contact	Cable Stripping Dimensions			Crimp Tools		Outer Ferrule
	+1/64 - .000 inches			Center Contact		
	A	B	C	Tool	Nest Bushing	
#1	7/32	5/64	7/64	Amphenol No. 294-211 Crimp Setting #5	Amphenol No. 294-1336	Thomas & Betts WT 200
#2	7/32	7/64	9/64	Amphenol No. 294-126	Amphenol No. 294-1014	Thomas & Betts WT 202



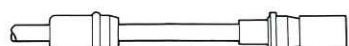
Insert stripped center conductor into contact until it shows through inspection hole and cable dielectric butts against contact. Fully seat contact into crimp tool and crimp in one full stroke. (Follow same crimping procedures shown on pages 14 & 15 except use nest bushing from above table.)



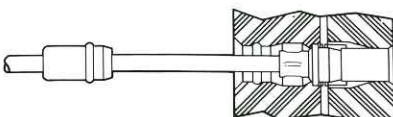
Slightly flare out ends of wire braid to facilitate insertion of inner ferrule of body assembly. (Do not comb out wire braid.)



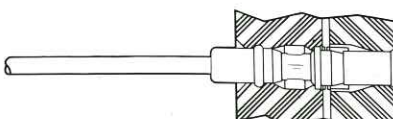
Install center contact in body assembly and slide inner ferrule underneath wire braid as shown. Push in center contact until it is locked in place in the body assembly. Pull lightly on cable to make sure that the contact is securely locked in place.



Slide outer ferrule over braid and up against body assembly as shown. There should be no slack in the wire braid. Crimp the outer ferrule with proper crimp tool from above table. When assembling the number 1 shielded contact, slide the rubber sealing sleeve toward the contact until the sleeve is touching the outer ferrule.



Insert the assembled shielded contact into the connector in the same way as the standard Poke Home contact, with applicable insertion tool, see page 16.

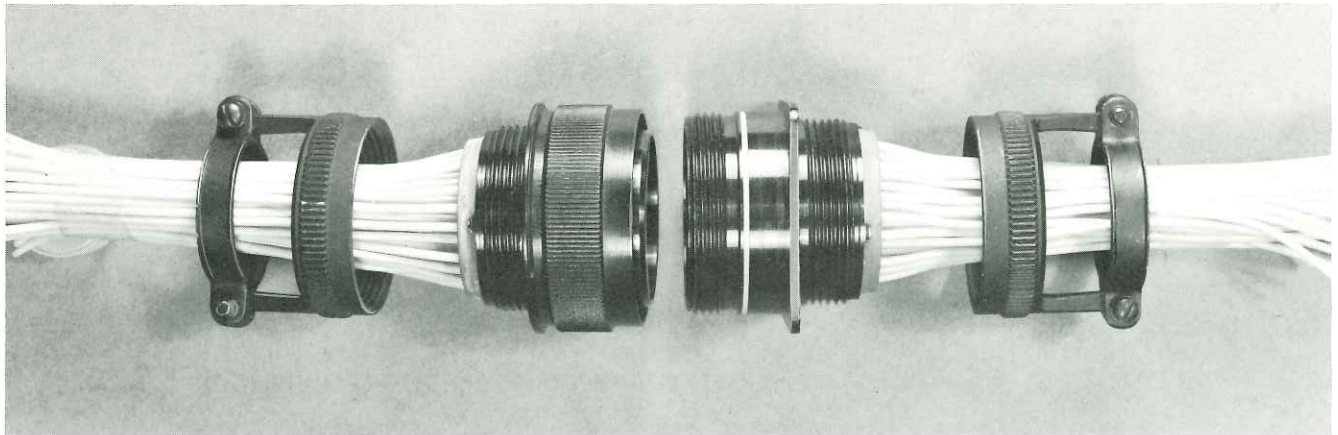


After assembling the number 2 shielded contact, push sealing boot forward into connector grommet until the O-ring riser of the boot has snapped into position to seal the grommet opening.



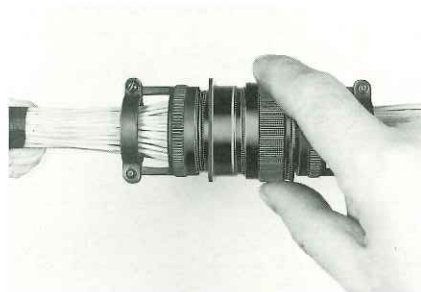
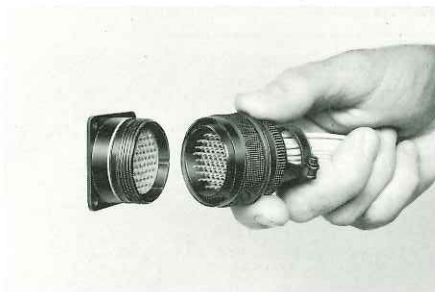
AMPHENOL

COMPLETING CONNECTOR ASSEMBLY



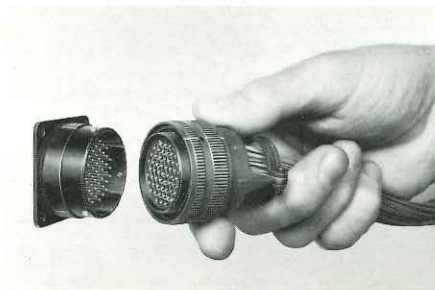
On both receptacle (right) and plug (left) slide cable support forward over cable and tighten until it bottoms to back of connector.

MATING CONNECTORS



THREADED COUPLING

Visually align large key on plug shell with large keyway in receptacle, then bring connectors together so the five polarizing keys fall into the proper keyways. Turn coupling ring clockwise to pick up receptacle threads, then tighten it until connector halves bottom metal to metal and visual indicator ring is covered. The connectors are then fully mated.



BAYONET COUPLING

Polarize plug and receptacle as for threaded pair, then rotate coupling ring clockwise so the three rivet-locks in the receptacle shell fit into inner grooves of coupling ring. Continue rotation until rivets snap into view through indicator holes, and axial alignment indicators coincide. The connectors are then fully mated.



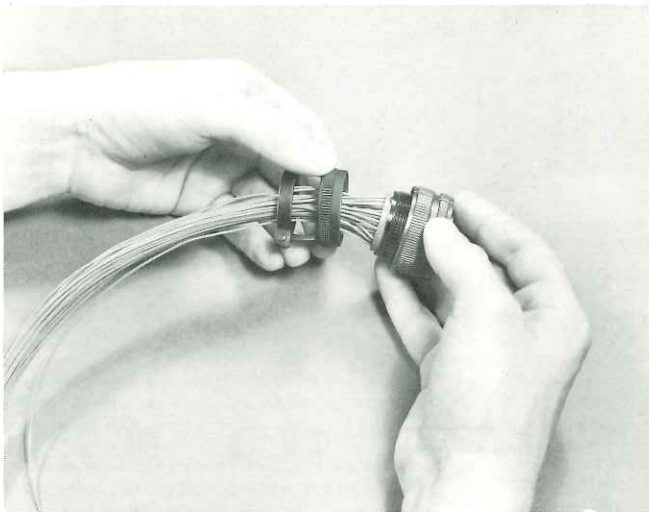
REMOVING POKE HOME CONTACTS

REMOVAL TOOLS

Select proper removal tool for the size of contact and type of connector.

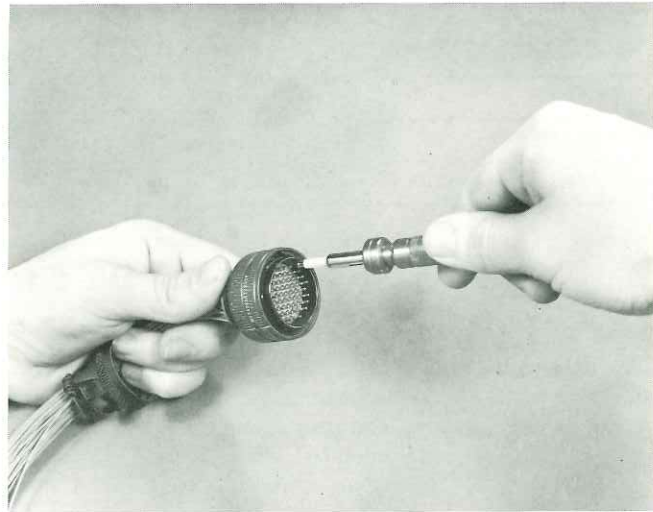
Contact Size	MIL-C-38300 Tools Part Number		MIL-C-26500 Tools Part Number	
	Amphenol	MS	Amphenol	MS
20	294-203	24256RH-20	294-89	24256R-20
20	294-185 (Full Cycle)	—	—	—
16	294-180	—	294-97	24256R-16
12	—	—	294-73	24256R-12
No. 1 Shielded	—	—	294-73	24256R-12
No. 2 Shielded	—	—	294-127	—

FOR MIL-C-38300 and MIL-C-26500 CONNECTORS



STEP 1

Remove cable support and slide back on wire bundle.



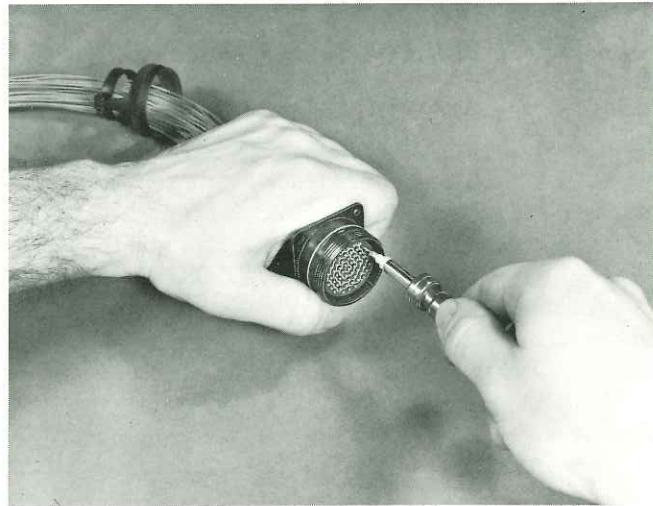
STEP 2 : PIN CONTACT

Hold removal tool at right angles to insert face, centered over contact to be removed. Then proceed as follows:



STEP 3: PIN CONTACT

Slide "pin" end of removal tool over pin contact to be removed and push until nylon pad seats on insert face, indicating that contact retention clip is opened. Then slide plunger knob forward to remove the contact.



STEP 3: SOCKET CONTACT (MIL-C-38300)

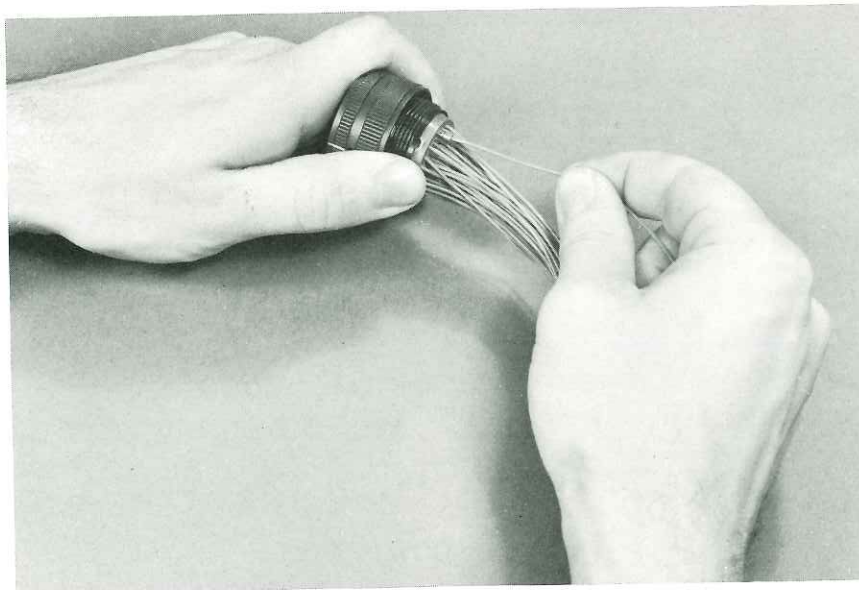
Align keys on "socket" end of removal tool with slots in the hard dielectric face. Slide tool into insert hole at socket contact to be removed with a straight motion and push until stop on tool seats against insert indicating that the retention clip is opened. Then slide plunger knob forward to remove the contact.

(continued on next page)



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REMOVING POKE HOME CONTACTS *(continued)*

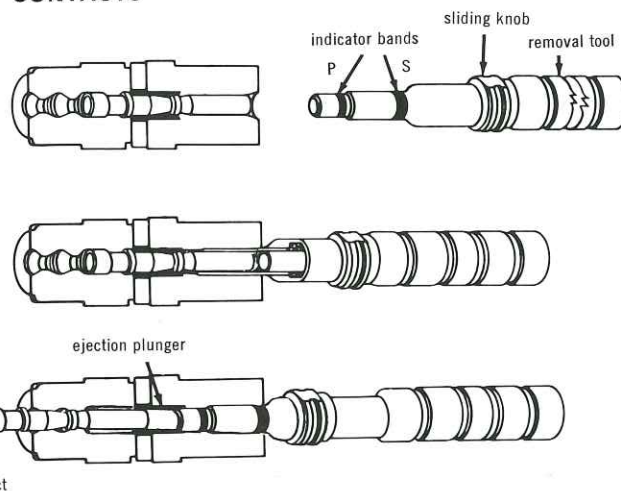


STEP 4

The contact now protrudes out of grommet. Grasp the wire and remove the contact from the connector.

FOR MIL-C-26500 CONNECTORS PIN AND SOCKET CONTACTS

A single-ended tool is used for both pin and socket contacts in MIL-C-26500 connectors. Slide the tool probe straight over contact into insert hole until the retention clip is fully opened, indicated when band "P" for pin contacts or "S" for socket contacts enters insert hole. (See illustration.) Then slide the plunger knob forward to remove the contact out of the retainer clip. Pull wire at rear of connector to fully remove contact. (See step 4 above.)



FULL CYCLE REMOVAL TOOL FOR MIL-C-38300 CONNECTORS



A full cycle removal tool (AMPHENOL 294-185 may also be used to remove socket contacts. Proceed as follows:

1. Insert three-bladed tip in connector insert.
2. Hold tool perpendicular to connector interface.
3. Press tool slowly until "blade stop" bottoms on insert face. Apply pressure constantly. (10 lbs. approx.)
4. When tool is bottomed on "blade stop" contact retention clip is opened, "plunger" is released and contact is automatically pushed out.
5. To remove next contact reset plunger by pulling back "plunger slide".

Each attempt to remove a contact should be followed through step 3.

When tool is not in use, store it with plunger and cover in forward position.



SOLDERING HERMETICALLY SEALED RECEPTACLES TO ALUMINUM & STAINLESS STEEL PANELS

Connector Operating Temperature	Solder Composition	Specification QQ-5-571d Equivalent
250°F	63% tin, 37% lead	63 Sn
350°F	96.5% tin, 3.5% silver	94 Sn
500°F	1.5% silver, 1% tin, 97.5% lead	1.5 Ag

BASIC CONSIDERATIONS

Stainless steel and aluminum require special soldering techniques and skills. AMPHENOL has developed and successfully used the procedures given here for making hermetically sealed solder joints between 48 Series connectors and steel or aluminum panels.

SURFACE TREATMENT—To permit use of the more common soldering techniques which do not require strong acidic fluxes, steel and aluminum panels should be prepared for soldering by a surface treatment. Two methods are described here: electroplating and tinning. Electroplating is preferred because it is easier to perform and requires less labor, skill, and operator training than tinning. With electroplating, the results are more uniform in quality and appearance.

HEATING—Because hermetic connectors contain a number of different materials which react independently under high temperature, heat must be applied carefully during soldering. The connector flange must be heated evenly and slowly to avoid severe thermal shock to the interior of the connector. If heat is applied unevenly or too quickly, the glass seal may crack. Cooling must be controlled for the same reason. Excessive heat may damage the silicone rubber seals. Insufficient heat or disturbance of the parts during solder solidification may cause a "cold joint." Therefore, the soldering temperature and time must be kept to the minimum that will insure a high quality hermetic joint.

SOLDERS—The following solders are recommended for use in equipment with operating temperatures to 250°F, 350°F, and 500°F.

Solders for the two lower operating temperatures should be used whenever possible. They flow more easily, require less heat, and melt at temperatures that will not tarnish, melt, or blister an electro-plated surface. The 500°F solder requires more care in heating to avoid cracking the glass seal and damaging the rubber insert.

The solders are eutectic alloys and melt fully at a lower temperature than solders with a plastic range. They were chosen for wetting ability in their temperature range. If a substitution is made, it is important that it be an alloy with good wetting characteristics to assure a hermetically sealed joint.

ELECTRO-PLATING

Since 48 Series hermetically sealed receptacles are of stainless steel, the solder joint area of both the connector and the stainless steel or aluminum panel must be coated with electro-plated tin and flowed in hot oil to assure a hermetically sealed solder joint. Connectors are available from AMPHENOL with solder flanges that are electro-tinned and flowed.

It is recommended that an aluminum panel be prepared for electro-tinning by first coating it with .0003"—.0005" thick electroless nickel, then heat treating it at 375°F for one hour. The panel should then be plated with .0002"—.0004" thick electro-tin.

A panel made of stainless steel can be electroplated in the conventional manner without the use of electroless nickel. The electro-plated tin is flowed in a hot oil bath at a temperature slightly above the melting point of the electro-plate. This will eliminate tin-pest and provide a readily solderable surface.

Mounting holes for the connectors should be made in the panel before plating so that the inside of the hole will also be electro-plated. The edge of the hole on the solder joint side of the panel must be free of burrs so that the connector flange will seat fully on the panel. The surface of the joint area should be relatively smooth and free of scratches. The diameter of the mounting hole should be from .007"—.015" larger than the diameter of the connector body that



fits in the hole. Be careful not to have the diameter of the hole exceed this limit. The recommended size for panel holes are as follows:

If it is undesirable to tin plate the entire panel, plating may be limited to the solder joint by masking the rest of the panel before plating. The plated area should be 1/32 inch larger in diameter than the connector flange. Soldering should be accomplished by using induction heat to assure a hermetic solder joint without cracking the glass seal. It is advisable to use an induction heater with a variable power input to control the soldering heat. Use a work coil with an outside diameter 1/4" larger than that of the solder flange.

RECOMMENDED PANEL HOLE SIZE FOR 48 SERIES HERMETICALLY SEALED RECEPTACLES

Connector Size	Panel Hole Diameter + .008" - .000"
10	.569
12	.757
14	.819
16	.944
18	1.069
20	1.319

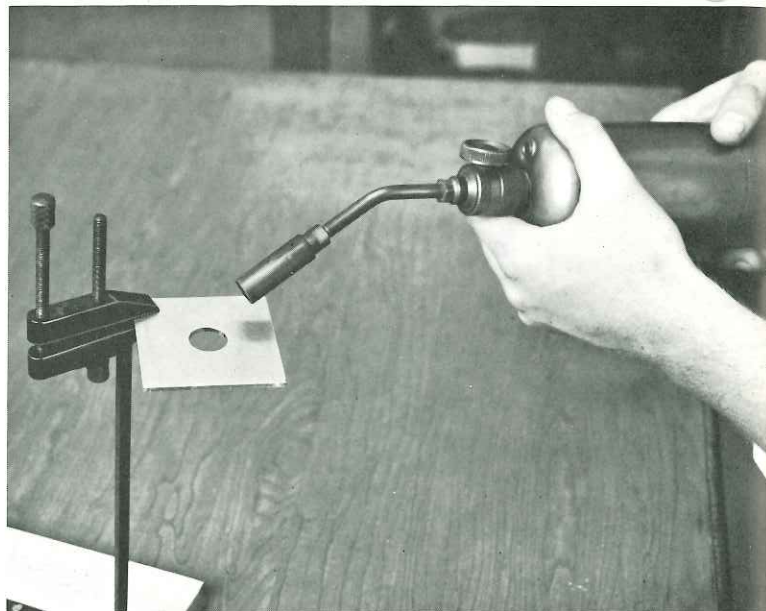
TINNING ALUMINUM PANELS

Because aluminum forms a tenacious and refractory oxide on which noncorrosive flux has no effect, a flux-less method of tinning is used on aluminum. Proceed as follows:

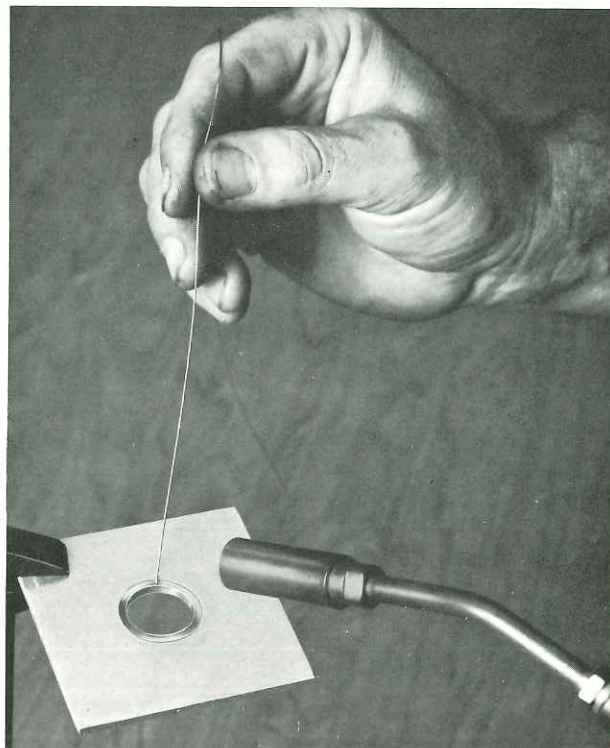
Remove the tarnished surface of the solder joint area on the panel with Allen Polish. Do not scratch the surface. Include inside of hole.

Clean the solder joint area of panel with a solvent (chloroethene) to remove contamination immediately before soldering. After cleaning, avoid contamination.

Preheat the solder joint area of the panel with an induction heater, a hot air gun, or a mild flame, preferably on the reverse side of the panel. The flame can be butane-air, propane-air or natural gas-air.

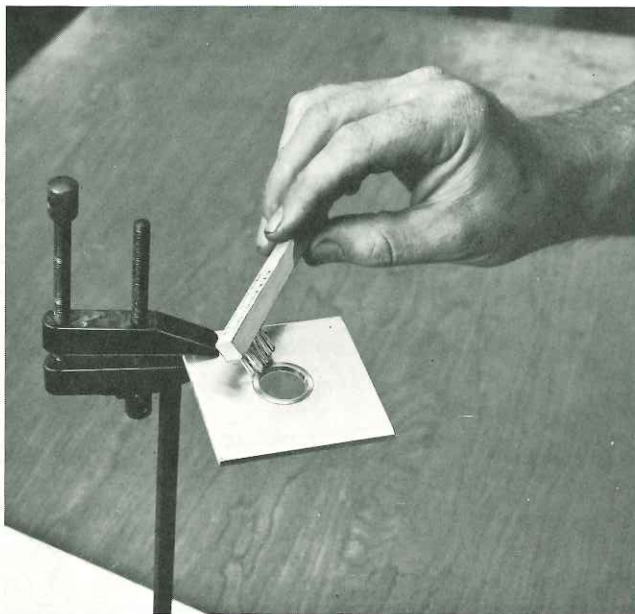


Apply Allen Alumi Solder, Standard Formula, to the joint area of the panel. Proper soldering temperature is reached when the solder melts on contact with the preheated aluminum panel. Maintain enough heat to keep the solder molten, but apply no more heat than necessary. Melt only enough solder to tin the desired joint area adequately, including inside of panel hole. Do not apply flame directly to solder.





Abrade panel surface under molten solder with a fine strand stainless steel brush. Do not permit strands from the brush to become embedded in the solder since the strands may prevent the formation of a hermetic joint. The abrading operation removes the oxide coat from the panel and allows the molten solder to come into direct contact with the aluminum. The entire area must be abraded to assure a continuous bond between the solder and aluminum (CAUTION: Solder will bridge a non-abraded surface without bonding to the panel.) An anodized surface must be removed in order to solder to aluminum.



TINNING STAINLESS STEEL PANELS

Remove the tarnished surface of the solder joint area on the panel with Allen Polish and clean with a solvent. Do not scratch the surface. After cleaning, avoid contamination.

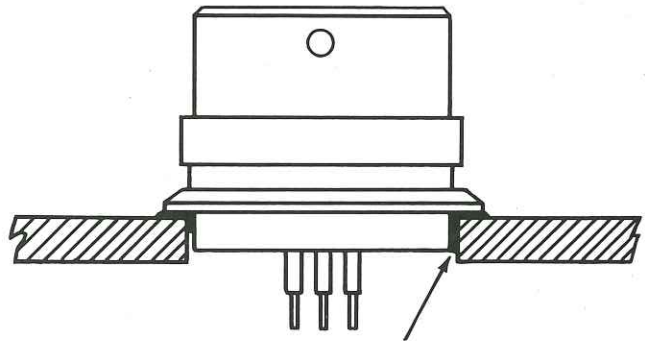
Tin the joint area of the panel using the tinning method for aluminum, just described, with two exceptions. The joint area must be coated with Divco #288 stainless steel flux, and the solder should be selected according to operating temperature from the table on page 21.

CAUTION: The brush that is used for abrading the stainless steel panel during tinning will absorb flux and must not be used for abrading aluminum panels.

Remove the flux residue after the panel has cooled. Wash thoroughly in hot running water, rinse and dry.

SOLDERING PROCEDURE

The procedure described here is designed to produce a hermetic solder seal by forming a fillet at the flange periphery and especially by filling the space between the panel hole and the connector shell. While it is most desirable that this space be completely filled, there can be a hermetic seal when the space is partially filled provided that the solder fillet is continuous within the hole. Factors that influence filling of this space include: (1) cleanliness of parts, (2) amount of solder used, (3) composition of the solder, (4) amount of heat, (5) uniformity in applying heat, (6) shape of preform, (7) diameter of hole, and (8) plating inside the panel hole.



A good solder seal is free of bubbles and entrapped flux. Apply the recommended diluted flux to the solder preform only. Application of flux to the panel and connector may result in flux entrapment that will prevent formation of a hermetic solder seal. Flux thinner must be added to the flux to compensate for evaporation of solvent.

The solder should be a preform consisting of one full turn of .036" diameter solid wire solder. The inside diameter of the preform should equal the diameter of the connector body that fits in the panel hole. The ends of the solder preform must butt to form a complete ring when placed on the connector. If a gap occurs, a void in the solder seal may result.





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SOLDERING PROCEDURE *(continued)*

Remove the "O" ring from the connector shell by blowing it out with a jet of compressed air (about 80 psi) into the face of the connector.

Clean the solder preform and joint area of both the panel and connector with a solvent such as acetone or chloroethene. After cleaning, avoid contamination from fingers or hand.

Support the panel in a horizontal plane with the induction heater work coil under it. Position the panel so the coil is concentric to the connector mounting hole and parallel to the panel. Clearance between coil and panel should be $\frac{1}{8}$ to $\frac{1}{4}$ inch.

Dip the solder preform in a flux mixture of activated rosin consisting of one part Kester 1544 flux and five parts of Kester 104 thinner. Do not apply flux to connector or panel.

Insert the connector with solder preform installed through the top of the panel mounting hole.



Place a weight of approximately 1 lb. on top of the connector so that the weight is equally distributed.

Turn on power.

CAUTION: At no time after the power is turned on should either the connector contacts or the panel be permitted to touch the work coil as the parts may be severely damaged. After the solder melts, wait until the connector settles into place and the molten solder forms a fillet at the periphery of the solder flange. Turn off power and permit connector and panel to cool slowly. Rapid or uneven heating or cooling may cause the glass seal to crack.

On a tinned panel, it may be necessary to hand feed wire solder at the flange periphery to get a smooth fillet. Use the same solder as in the solder ring preform. Hand fed solid wire solder must be dipped in undiluted Kester 1544 flux. Avoid flux entrapment.

After the joint is cooled, remove the flux residue from both sides of the panel. Kester flux remover AP-20 may be used. Be certain to remove all flux residue prior to testing for a hermetic joint.

Should a poor joint or seal be obtained on a tinned panel, remelt the solder and hand feed solder at the flange periphery if necessary to get a smooth fillet. Avoid overheating of parts.

No discoloration of the panel will result from solders for 250°F and 350°F operating temperatures if excessive heat is not used. With these solders, a hermetic joint can be obtained without melting the tin plate or causing discoloration.

With the solder for 500°F operation, the heat required to melt the solder exceeds the melting point of tin. Therefore, only the solder joint area of the panel should be electro-plated. It may be plated with tin or with the solder recommended for 500°F operation. The 1.5 Ag electro-solder, which has a melting point of 588°F, will give a joint that is stronger at 500°F than if the joint area is plated with electro-tin. Electro-solder must be flowed in hot oil. Under normal atmospheric conditions, discoloration of the panel will occur. To eliminate discoloration, use an inert gas blanket.

If the soldering produces discoloration, the surface can be restored by using Allen Polish for Stainless Steel which also works well on aluminum.

Replace the "O" ring in the connector. Be certain to seat the "O" ring properly in the "O" ring groove.

Avoid disturbing the skin of the joint during and after cooling. Don't try to improve the appearance of the joint with a sharp tool, as this may break the skin.



WEIGHTS OF CONNECTORS, CONTACTS & CABLE SUPPORTS

THREADED CONNECTOR WEIGHTS IN POUNDS ($\pm 10\%$)

RESILIENT INSERT WITH CABLE SUPPORT & LESS CONTACTS

SHELL SIZE & CONTACT ARRANGEMENT	PLUG SHELL ASSEMBLY		SQUARE FLANGE RECEPTACLE		SINGLE HOLE MTG. RECEPTACLE	
	with pin insert	with socket insert	with pin insert	with socket insert	with pin insert	with socket insert
10-2	.044	.045	.037	.038	.047	.048
10-5	.043	.044	.036	.037	.046	.047
12-3*	.058	.060	.050	.052	.064	.066
12-12	.057	.059	.049	.051	.063	.065
14-3***	.064	.067	.055	.058	.072	.075
14-4**	.062	.064	.053	.055	.070	.072
14-7*	.063	.065	.054	.056	.071	.073
14-12****	.062	.064	.054	.056	.071	.073
14-15	.065	.068	.056	.059	.073	.076
16-10*	.076	.079	.065	.069	.083	.086
16-24	.075	.078	.065	.068	.083	.086
18-8**	.090	.094	.079	.083	.099	.103
18-11***	.088	.092	.077	.081	.097	.101
18-14*	.089	.094	.078	.083	.098	.103
18-31	.087	.092	.076	.081	.096	.101
20-16*	.106	.112	.090	.096	.111	.117
20-25*****	.104	.110	.088	.094	.109	.115
20-28*****	.105	.110	.089	.094	.110	.115
20-39****	.105	.110	.089	.094	.110	.115
20-41	.105	.110	.089	.094	.110	.115
22-12**	.118	.126	.105	.113	.134	.142
22-19*	.119	.128	.106	.115	.135	.144
22-32*****	.120	.129	.107	.116	.136	.145
22-55	.117	.125	.104	.112	.133	.141
24-61	.135	.143	.119	.127	.147	.155

CABLE SUPPORTS, WEIGHT

Shell Size	MS Part No.	Weight
10	27291-1	.013
12	27291-2	.015
14	27291-3	.017
16	27291-4	.019
18	27291-5	.020
22	27291-6	.025
20	—	.022
24	—	.026

CONTACTS, WEIGHT

No.	Pin Contacts, lb.	Socket Contacts, lb.
12	.00359	.00353
16	.00177	.00175
20	.00084	.00082
2	.0062	.0059
(shielded)		.0054
1		
(shielded)	.0026	.0026

BAYONET CONNECTOR WEIGHTS IN POUNDS ($\pm 10\%$)

RESILIENT INSERT WITH CABLE SUPPORT & LESS CONTACTS

SHELL SIZE & CONTACT ARRANGEMENT	PLUG SHELL ASSEMBLY		SQUARE FLANGE RECEPTACLE		SINGLE HOLE MTG. RECEPTACLE	
	with pin insert	with socket insert	with pin insert	with socket insert	with pin insert	with socket insert
10-2	.043	.044	.036	.037	.047	.048
10-20*	.043	.044	.036	.037	—	—
10-5	.042	.043	.035	.036	.046	.047
12-3*	.057	.059	.049	.051	.063	.065
12-12	.056	.058	.048	.050	.062	.064
14-3***	.063	.066	.054	.057	.071	.074
14-4**	.061	.063	.052	.054	.069	.071
14-7*	.062	.064	.053	.055	.070	.072
14-12****	.063	.065	.054	.056	.071	.073
14-15	.064	.067	.055	.058	.072	.075
16-10*	.076	.079	.066	.069	.084	.087
16-24	.074	.077	.064	.067	.082	.085
18-8**	.089	.093	.078	.082	.098	.102
18-11***	.087	.091	.076	.080	.096	.100
18-14*	.088	.093	.077	.082	.097	.102
18-31	.086	.091	.075	.080	.095	.100
20-16*	.102	.106	.089	.095	.112	.118
20-25*****	.100	.106	.087	.093	.110	.116
20-28*****	.101	.106	.088	.093	.111	.116
20-39****	.101	.106	.088	.093	.111	.116
20-41	.101	.106	.088	.093	.111	.116
22-12**	.117	.125	.104	.112	.133	.141
22-19*	.118	.127	.105	.114	.134	.143
22-32*****	.119	.128	.106	.115	.135	.144
22-55	.116	.124	.103	.111	.132	.140
24-43****	.132	.140	.117	.125	—	—
24-61	.132	.140	.117	.125	.147	.155

LEGEND:

Blank—20 size contacts
 *—16 size contacts
 **—12 size contacts
 ***—16 size contacts with #2 shielded coaxial contact
 ****—20 size contacts with 16 size contacts
 *****—20 size contacts with 12 size contacts

THREADED CLOSED ENTRY INSERT CONNECTORS LESS CABLE SUPPORT & CONTACTS

WEIGHTS IN POUNDS ($\pm 10\%$)

SHELL SIZE & CONTACT ARRANGEMENT	WITH SOCKET INSERT		
	Plug	Sq. Flange Recept.	Single Hole Mtg. Recept.
10-5	.029	.025	.035
12-12	.045	.039	.053
14-7*	.051	.043	.059
14-15	.052	.044	.060
16-24	.066	.056	.073
18-31	.082	.069	.089
22-19*	.113	.102	.128
22-55	.115	.102	.128

BAYONET CLOSED ENTRY INSERT CONNECTORS LESS CABLE SUPPORT & CONTACTS

WEIGHTS IN POUNDS ($\pm 10\%$)

SHELL SIZE & CONTACT ARRANGEMENT	WITH SOCKET INSERT		
	Plug	Sq. Flange Recept.	Single Hole Mtg. Recept.
10-5	.036	.029	.040
12-12	.048	.039	.053
14-7*	.052	.043	.058
14-15	.053	.045	.060
16-24	.067	.056	.074
18-31	.080	.068	.089
20-41	.097	.084	.109
22-19*	.118	.104	.127
22-55	.114	.100	.130
24-61	.135	.120	.150

PERFORMANCE CHARACTERISTICS

48 series connectors are designed to meet the Qualification Test Sequence of MIL-C-26500 (USAF) & MIL-C-38300 (USAF) as summarized below. Eight connectors are tested each wired with applicable MS wire (polytetrafluoroethylene-insulated copper wire). Samples 1, 3, 5, 7 are wired with smallest wire for which contacts are designed

(e.g. 24 gauge for size 20 contacts) and samples 2, 4, 6, 8 are wired with largest wire contacts will accommodate (20 gauge for size 20 contacts). In a percentage of the holes in each connector, wires are omitted and sealing plugs are inserted behind contacts.

NO.	TEST	SUMMARY OF PROCEDURE	SAMPLE NUMBER											
			Class R								Class H			
			1	2	3	4	5	6	7	8	1,2	3,4		
1	examination of connector	Each sample is checked for conformity to specification, including: materials and finish; design and construction; proper identification of product; interchangeability of connectors and quality of workmanship.	X	X	X	X	X	X	X	X	X	X	X	
2	coupling forces	Torques or axial forces required to couple and uncouple mating plugs and receptacles is not to exceed values listed: shell size 10 12 14 16 18 20 22 torque, in.-lb. 10 14 17 23 26 31 38	X	X	X	X	X	X	X	X	X	X	X	
3	maintenance aging	To provide accelerated maintenance aging of contacts, contact-locking mechanism and sealing provisions prior to environmental tests, connectors are coupled and uncoupled 10 times and 20% but not less than 3 of the contacts in both plugs and receptacles are removed and inserted 10 times each with no observable damage and meet balance of test requirements.	X	X	X	X	X	X	X	X	X	X	X	
4	contact insertion and removal force	Under 8 lb. except last 10% of the contacts installed which shall not exceed 15 lb. Individual removal forces not to exceed 10 lb.							X	X	X	X	X	
5	thermal shock,* (mated)	Cycled five times from —65°C to + 260°C, held for 30 min. at each temperature and transferred from one temperature to the other in 2 min. or less, with no evidence of damage.	X	X	X	X	X	X	X	X	X	X	X	
6	high potential voltage sea level (unmated)	Test voltage of 1500 volts rms applied between closest contacts and between shell and closest contacts for 1 min. with no break down or flashover.	X	X	X	X	X	X	X	X	X	X	X	
7	fluid immersion	Unmated sample 7 is soaked in hydraulic fluid MIL-H-5606 for 20 hours; unmated sample 8 in lubrication oil MIL-L-9236 for 20 hr. Both samples then remain in free air for 1 hr, then mated by hand and must meet balance of test sequence.									X	X	X	
8	coupling durability	Connectors are coupled and uncoupled 200 times for type T and 500 times for type B and must then pass following tests.	X	X									X	
9	vibration (mated)*	With contacts wired in series, carrying 100 ma current, samples are subjected to a program of vibrations of 0.06 in. double amplitude or 20 g's acceleration from 10 to 2000 cps for 4 hr. in each of the three major axes according to MIL-STD-202, Method 204, Condition D. Connectors are tested at —65°C ambient and at + 200°C ambient. No interruption of electrical continuity greater than 1 micro-second during or after test is allowed.	X	X			X	X						
10	physical shock (mated)	Connectors fully wired with leads at least 8 in. long are subjected to 50 g's along each axes with no physical damage resulting.	X	X									X	
11	moisture resistance (mated)	After 10 continuous cycles (10 days) of high humidity as specified in MIL-STD-202, Method 106, (omitting step 7b), measured insulation resistance while still subjected to high humidity must be at least 1000 megohms.	X	X									X	
12	insulation resistance (mated)	Measured between closest pair of contacts and between shell and closest contact, per MIL-STD-202, Method 302, Condition B, insulation resistance must be greater than 5000 megohms.	X	X									X	
13	corrosion (unmated)	After 48 hr. exposure to salt spray, per MIL-STD-202, Method 101, Condition B, connectors are rinsed with tap water, oven dried, cooled to room temperature and checked to make sure no corrosion has occurred or base metal exposed.	X	X									X	

*Low temperature extremes: MIL-C-26500: -55°C
MIL-C-38300: -65°C

PERFORMANCE CHARACTERISTICS (continued)

NO.	TEST	SUMMARY OF PROCEDURE	SAMPLE NUMBER									
			Class R								Class H	
			1	2	3	4	5	6	7	8	1,2	3,4
14	temperature life (mated)	1000 hr. exposure to 200°C ambient temperature while carrying sufficient current (without exceeding contact rating) to maintain contact temperature of 238°C.			X	X					X	
15	insulation resistance, high temperature	Mated connectors must maintain minimum insulation resistance of 2000 megohms measured at 200°C ambient temperature.			X	X						
16	ozone exposure (unmated)	2 hr. exposure to room temperature air having minimum ozone concentration of 0.01 to 0.015 per cent by volume, without deterioration.						X	X			
17	magnetic permeability	All component parts of Class R shall be of a nonferrous material; the permeability of the assembled connector shall be less than 2.0 mu.						X	X			
18	insulation resistance (mated)	Same procedure and requirements as step 12.						X	X			
19	insert retention	No insert dislocation when plugs and receptacles are subjected to axial loads of 75 lbs. in either direction for 5 sec. For hermetics 5000 P.S.I. for 5 seconds.*	X	X							X	
20	coupling forces	Same procedure and requirements as step 2.	X	X	X	X	X	X	X	X	X	X
21	high potential voltage sea level (unmated)	Same procedure and requirements as step 6.	X	X	X	X	X	X			X	
22	air leakage (unmated)	With 30 psi pressure differential across class "R" receptacle, leakage through receptacle at -55°C shall not exceed 1 cu. in./hr. Hermetic receptacle, class H shall not exceed 0.01 micron cubic foot per hour.	X	X			X	X			X	
23	contact retention	Contacts locking mechanism must withstand an axial force of 20-lb. size 20, 25-lb. size 16, 30-lb. size 12 minimum in both directions. During the test, the axial displacement shall not exceed .012 inches when pressures are applied from the face side.	X	X	X	X	X	X				
24	altitude immersion (mated)	After 3 cycles immersed in salt water with pressure reduced to 1 in. Hg. (75,000 ft. altitude) for 30 min. and returned to atmospheric pressure, with connectors still submerged insulation resistance should remain 5000 megohms minimum and support 1500 volts rms applied without flashover or breakdown.	X	X			X	X	X	X	X	
25	insulation resistance (mated)	Same procedure and requirements as step 12.			X	X	X	X	X	X	X	
26	high potential voltage altitude (mated)	At 10,000 ft. 1250 volts rms and at 20,000 ft. intervals from 30,000 to 110,000 ft., 1000 volts rms is applied for 1 min. intervals per MIL-STD-202, Method 301 with no flashover or breakdown.			X	X	X	X	X	X	X	
27	high potential voltage altitude (unmated)	Same procedure as step 26 except that applied potential is progressively reduced at each higher altitude test point from 1250 volts rms at 10,000 ft. to 200 volts rms at 110,000 ft. without flash-over or breakdown.	X	X	X	X					X	
28	contact insertion & removal force	Same procedure and requirement as step 4.						X	X	X	X	
29	contact resistance	Class R contacts meet requirements of MIL-C-26636 at 25°C and 200°C. Class H contacts when mated with class R plug shall not exceed contact resistance of class R contacts by an average of 700%. See contact chart.			X	X					X	
30	examination of product	Step 1 repeated to verify satisfactory condition of connectors after entire test sequence has been completed	X	X	X	X	X	X	X	X	X	X

*MIL-C-38300 requirement for hermetics.

PERFORMANCE CHARACTERISTICS *(continued)*

Contacts for 48 series connectors are designed to meet the Qualification Test Sequence of MIL-C-26636 USAF as summarized below. For test purposes 120 pairs of Pin & Socket Contacts of all Contact & Wire sizes are divided into three groups as follows:

Group A & B (each)—15 size 20 contacts with 20 ga. wire
15 size 16 contacts with 16 ga. wire
15 size 12 contacts with 12 ga. wire

Group C—5 each size 20 contacts with 20, 22, 24 ga. wire
5 each size 16 contacts with 16, 18, 20 ga. wire
5 each size 12 contacts with 12 and 14 ga. wire
Each contact is crimped to MIL-W-27300 wire with extruded insulation, using the standard crimping tool per MS 3191.

NO.	TEST	SUMMARY OF PROCEDURE	CONTACT GROUP																																					
			A	B	C																																			
1	examination of contacts	Each contact is checked for conformity to specification including: materials and finish, design and construction, etc. using approximately a 3X power magnification device.	X	X	X																																			
2	current-temperature durability	Contacts assembled in largest applicable connector (mated) of maximum contact density are subjected to 200°C ambient temperature for 1000 hr. while carrying sufficient current (not exceeding rating) to maintain contact temperature of 238°C. After which contact resistance is measured in step 3.	X																																					
3	contact resistance	Potential drop across each mated pair of contacts (measured from wire to wire to include crimped connections). <table><tr><td>contact size</td><td>20</td><td>16</td><td>12</td></tr><tr><td>wire size</td><td>20</td><td>16</td><td>12</td></tr><tr><td>test current, amp</td><td>7½</td><td>20</td><td>35</td></tr><tr><td colspan="4">potential drop, mv</td></tr><tr><td> @ 25°C</td><td>15</td><td>21</td><td>22</td></tr><tr><td> @ 200°C</td><td>26</td><td>36</td><td>36</td></tr><tr><td>after step 5</td><td>23</td><td>38</td><td>38</td></tr></table>	contact size	20	16	12	wire size	20	16	12	test current, amp	7½	20	35	potential drop, mv				@ 25°C	15	21	22	@ 200°C	26	36	36	after step 5	23	38	38	X									
contact size	20	16	12																																					
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@ 200°C	26	36	36																																					
after step 5	23	38	38																																					
4	probe damage (socket)	With socket contacts assembled in socket connector, a hardened steel probe same size as mating pin contact is inserted into each socket. With bending moment applied (½ in.-lb. for size 20 contacts; 2 in.-lb. for sizes 16, 12), contact is rotated 360 deg. about probe. Test is repeated with spacer in place, and then contact engaging and separating forces are measured. Contacts shall meet engaging and separating forces. Item 6 below.	X	X																																				
5	durability conditioning	After 500 cycles of mating and unmating pin and socket contacts in plug and receptacle connectors, unmated connectors are subjected to 48 hr. salt spray test, per MIL-STD-202, Method 101, Condition B. Following salt spray test and after first mating, contacts shall carry current with a maximum source potential of 0.5 millivolt. See Step 3 for millivolt drop after test. Contact engaging and separation forces shall not exceed forces in Step 6. table by 20 percent.		X																																				
6	contact engaging and separating force	Forces required to engage and separate socket contacts with random pin contacts and steel pins per MS3197 are to fall within values listed. <table><tr><td rowspan="2">contact size</td><td colspan="5">force, lb.</td></tr><tr><td colspan="2">random pins</td><td colspan="3">steel pins</td></tr><tr><td></td><td>max.</td><td>min.</td><td>min.</td><td>max.</td><td></td></tr><tr><td>20</td><td>0.50</td><td>0.07</td><td>0.03</td><td>0.44</td><td></td></tr><tr><td>16</td><td>1.00</td><td>0.20</td><td>0.10</td><td>0.85</td><td></td></tr><tr><td>12</td><td>1.60</td><td>0.35</td><td>0.20</td><td>1.20</td><td></td></tr></table>	contact size	force, lb.					random pins		steel pins				max.	min.	min.	max.		20	0.50	0.07	0.03	0.44		16	1.00	0.20	0.10	0.85		12	1.60	0.35	0.20	1.20		X	X	X
contact size	force, lb.																																							
	random pins		steel pins																																					
	max.	min.	min.	max.																																				
20	0.50	0.07	0.03	0.44																																				
16	1.00	0.20	0.10	0.85																																				
12	1.60	0.35	0.20	1.20																																				
7	contact resistance	See requirements in step 3.		X																																				
8	examination of contacts	Examination of step 1 repeated to verify that contacts survive above tests without damage.	X	X	X																																			
9	Size 20 pin contact strength	The pin contact shall support a 2 lb. load applied to the tip without producing more than a .005 inch permanent set.			X																																			
10	tensile strength	Crimped connections are to withstand the following minimum strength values. <table><tr><td>contact size</td><td colspan="3">20</td><td colspan="3">16</td><td colspan="3">12</td></tr><tr><td>wire gage</td><td>24</td><td>22</td><td>20</td><td>20</td><td>18</td><td>16</td><td>14</td><td>12</td><td></td></tr><tr><td>min. tensile strength, lb.</td><td>10</td><td>15</td><td>19</td><td>19</td><td>38</td><td>50</td><td>70</td><td>110</td><td></td></tr></table>	contact size	20			16			12			wire gage	24	22	20	20	18	16	14	12		min. tensile strength, lb.	10	15	19	19	38	50	70	110		X		X					
contact size	20			16			12																																	
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MIL-C-26500 & MIL-C-38300 TECHNICAL CONSIDERATIONS

The performance capabilities built into 48 series connectors were specifically developed to meet future as well as present requirements of electrical and electronic equipment for aviation, missile, instrumentation and industrial applications. These requirements—which include those detailed in Military Specifications MIL-C-26500 (USAF) and MIL-C-38300 (USAF) for circular connectors and MIL-C-26636 (USAF) for removable crimped contacts—emphasize the need for connectors to withstand the combined effects of wide variations in temperature, humidity, altitude (pressure), shock and vibration, and repeated human handling.

By designing for ease of assembly and maintenance, including ease of re-wiring, it has been possible to achieve in the 48 series a line of high-performance, high reliability connectors that in cost, on a wired and assembled harness basis, compare favorably with more limited designs.

Heretofore connector design has tended to lag equipment design, resulting in a seemingly endless number of specials coming into use simply for expediency. This has caused an intolerable logistics problem among equipment users who have been forced to stock many different connector types. By providing performance capabilities in advance of actual need, 48 series connectors offer equipment designers an opportunity to specify connectors that will not soon become obsolete, but will be a widely stocked item for many years to come.

Following are some of the basic environmental considerations that influenced the design of 48 series connectors:

THERMAL CONSIDERATIONS: 48 series connectors must not only operate continuously without breakdown at 200°C with short time exposures to 800°C, but also must maintain an environmental seal against air and moisture despite thermal expansion and compression or thermal shock. In addition they must mate and unmate freely without fusing of inserts or welding of mated contacts.

These requirements were met by (1) developing an AMPHENOL-modified fusion-resistant silicone rubber for the insert dielectric, (2) metal-to-metal shoulder of the mating shells to limit sealing stresses and rigid anti-deflection disc to control insert expansion and (3) solderless crimped contacts of high-conductivity copper alloy with weld-resistant rhodium plate over silver finish (instead of gold plate which welds at 190°C when subjected to high temperature plus bearing stresses).

AMPHENOL silicone rubber, in addition to meeting the 200°C requirement, represents a definite advance in other essential connector insert properties, as tabulated below—outperforming such materials as neoprene rubber (MIL-approved for 125°C service).

TIME-TEMPERATURE-CURRENT CAPABILITY: For many years MS connectors such as MIL-C-5015 and MIL-C-26482 have been considered capable of operating in 125°C

ambient temperatures. This interpretation has been based on thermal shock requirements (i.e. temperature cycling from +125°C to -55°C) rather than any consideration of current-carrying capabilities at 125°C.

In the development of 48 series connectors, the combined effects of time, temperature and current were studied and it was found, as shown in Fig. 1 (next page), that 48 series connectors could operate continuously at 200°C while carrying 50 per cent rated current. Similar studies of MIL-C-5015 and MIL-C-26482 connectors (also summarized in Fig. 1) showed that these nominal 125°C connectors would have to operate in ambient temperatures considerably below 125°C when carrying any appreciable current. Thus the implied rated temperature difference

PROPERTIES OF AMPHENOL SILICONE RUBBER COMPARED TO NEOPRENE

	Amphenol-modified silicone rubber	Neoprene
temperature effects: insulation resistance for MS—"A" spacing at 25°C at 125°C at 260°C	1,000,000 megohms 500,000 megohms 100,000 megohms	100,000 megohms 150 megohms —
Compression set after 1000 hr at 100°C	10 percent	80 percent
humidity effect: insulation resistance after 100 hr exposure	500,000 megohms	2,000 megohms
specific gravity (relative weight)	1.2	1.5
ozone resistance, 0.010 to 0.015 percent conc.	Good	Fair
low temperature flexibility, min. temperature	-73.3°C	-55°C
moldability, especially in thin wall sections	Excellent	Good
dielectric strength	400 volts/mil	300 volts/mil
maximum continuous safe temperature	200°C	125°C

of 75°C (135°F) between 48 series connectors and MIL-C-5015, MIL-C-26482 designs is not representative. Under actual operating conditions the effective temperature difference is in the order of (90° to 125° C) 200° to 260° F.

Temperature capabilities are significant indicators of environmental reliability, and 48 series connectors have a much greater life expectancy than so-called 125°C connectors at equivalent ambient temperatures.

(continued)

FIG. 1—Maximum ambient temperature vs current flow for continuous operation of MIL-C-26500, MIL-C-5015D and MIL-C-26482 connectors.

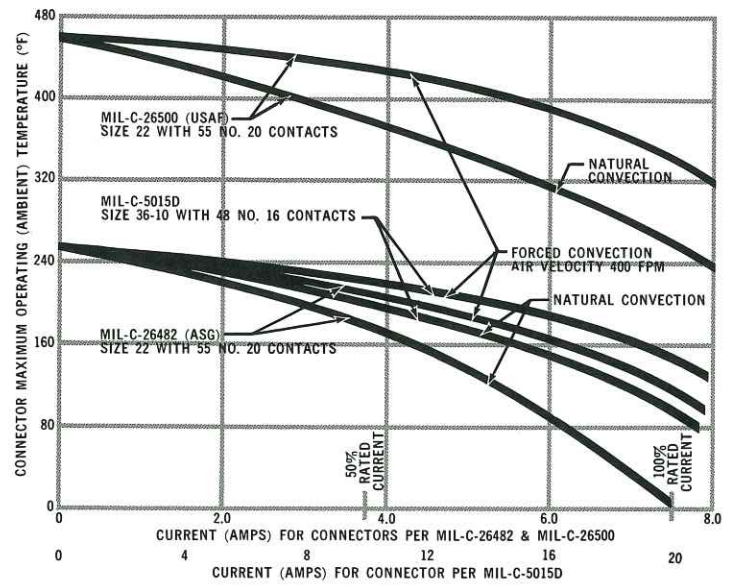


FIG. 2—Maximum ambient temperature vs current flow for 48 series connectors at various air convection conditions.

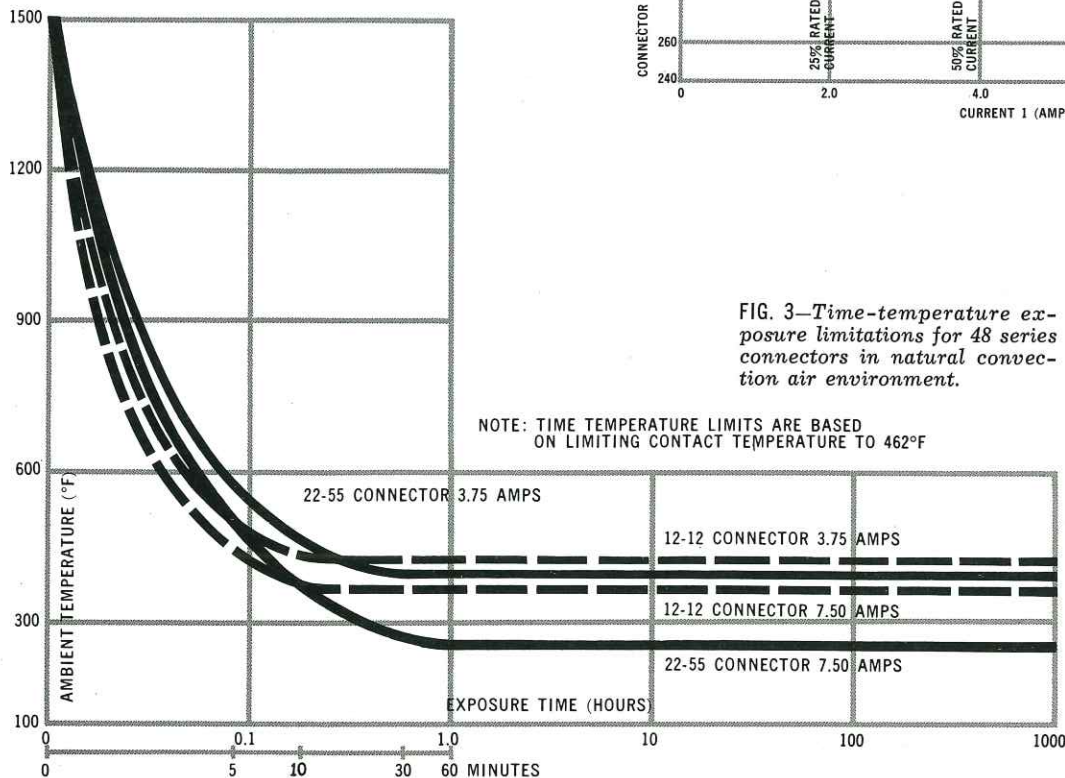
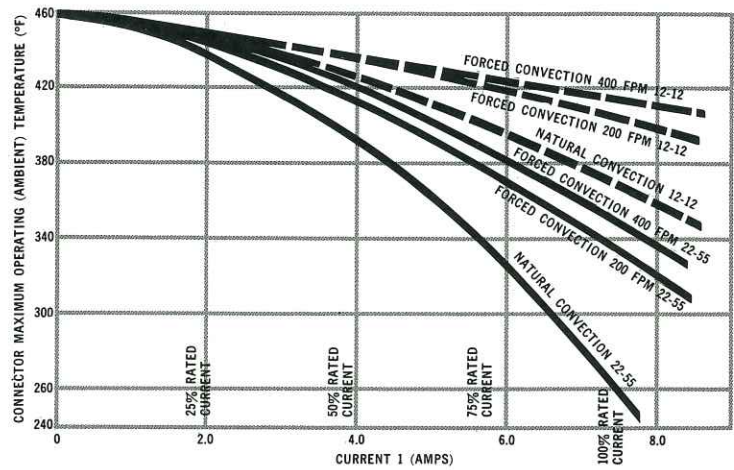
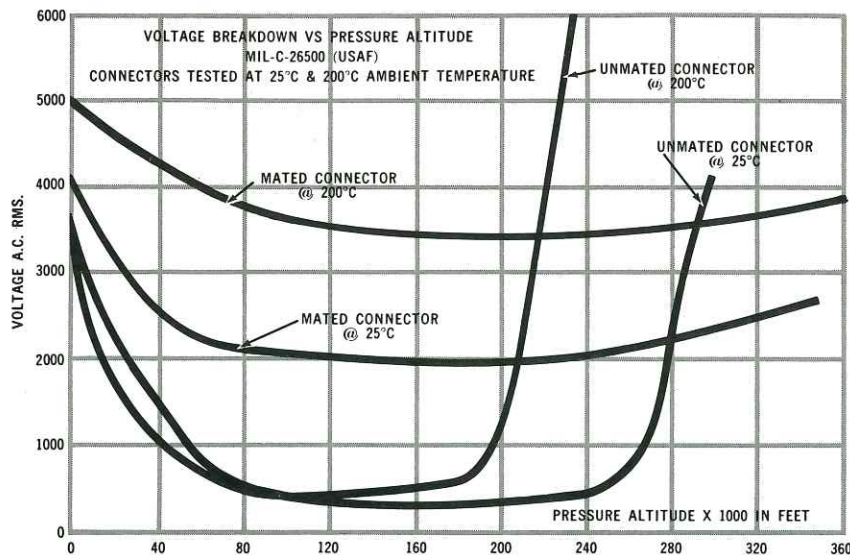


FIG. 3—Time-temperature exposure limitations for 48 series connectors in natural convection air environment.

FIG. 4—Voltage breakdown vs altitude for 48 series connectors.



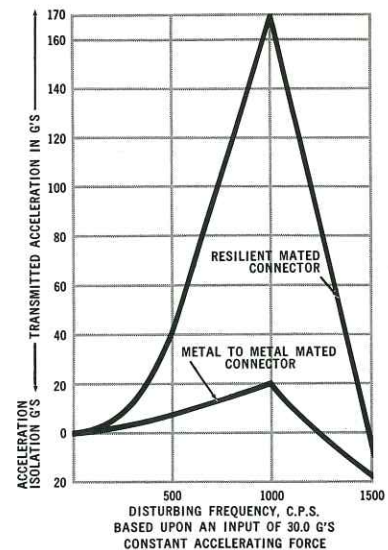
APPLICATION DATA: To assist engineers and designers in the proper application of 48 series connectors, AMPHENOL has established definite criteria for determining time-temperature-current capability. The expanded vertical scale of Fig. 2 shows the maximum continuous operating temperature for two different 48 series connectors as a function of current flow (based on flow through all contacts) under various air convection conditions. Figure 3 details short-time exposure capabilities up to 1500°F. MOISTURE/ALTITUDE EFFECTS: Entrapped air and moisture can both contribute to voltage breakdown in a connector, especially when pressure changes are involved—as for example in changes of altitude. Their effects can be minimized by (1) maintaining an air-tight seal and (2) eliminating any voids within the connector where air or moisture could accumulate.

At sea level, air has satisfactory dielectric properties, but any reduction in air density (as happens at high altitudes) reduces its dielectric strength. Entrapped air in a connector subjected to high altitude will tend to leak out, lowering the air density in the voids and reducing the voltage safety factor of the connector. If the entrapped air contains moisture, a decrease in temperature will cause the moisture to condense onto the dielectric surfaces, leading directly to electrical failures. Even if initially the entrapped air is dry, altitude cycling could result in external moisture being sucked into the connector void when altitude is reduced.

These dangers are eliminated in the 48 series by the voidless monoblock construction of plug and receptacle, and the five-point environmental seal illustrated on page 2.

The effectiveness of the seal is verified by the highly important "altitude immersion test" detailed on page 27,

FIG. 5—Effects of vibration on metal-to-metal vs resilient-mated connector designs.



which simulates conditions in an aircraft or missile changing altitude with moisture present. When the test chamber pressure is raised from 1 in. Hg to atmospheric pressure, moisture will be forced into any unsealed void within the connector. The connector's sealing ability can be determined by test.

Potting is unnecessary due to the thorough bonding achieved with AMPHENOL-formulated cement and the triple sealing risers employed in the grommet. This design has proved to be highly successful in preventing voltage breakdown at high altitude, as demonstrated by the curves of Fig. 4.

VIBRATION: Among the severest mechanical stresses to which a connector can be subjected are those induced by vibration at a resonant frequency. By the nature of their installation in many applications, connectors can not rely on external shock-absorbing devices, but must depend on self-damping to prevent contact chatter.

In the development of 48 series connectors, several basic damping concepts were investigated: (1) a resilient mate whereby the coupled shells floated without a positive metal-to-metal seat, (2) a positive metal-to-metal shoulder between the mated shells.

The findings are shown in Fig. 5 for a resonant point falling in the order of 1000 cps. In the resilient-mated case the induced vibration was amplified nearly six times at resonance while in the metal-to-metal mated case the resonant vibrations built up to only $\frac{2}{3}$ of the applied accelerating force.

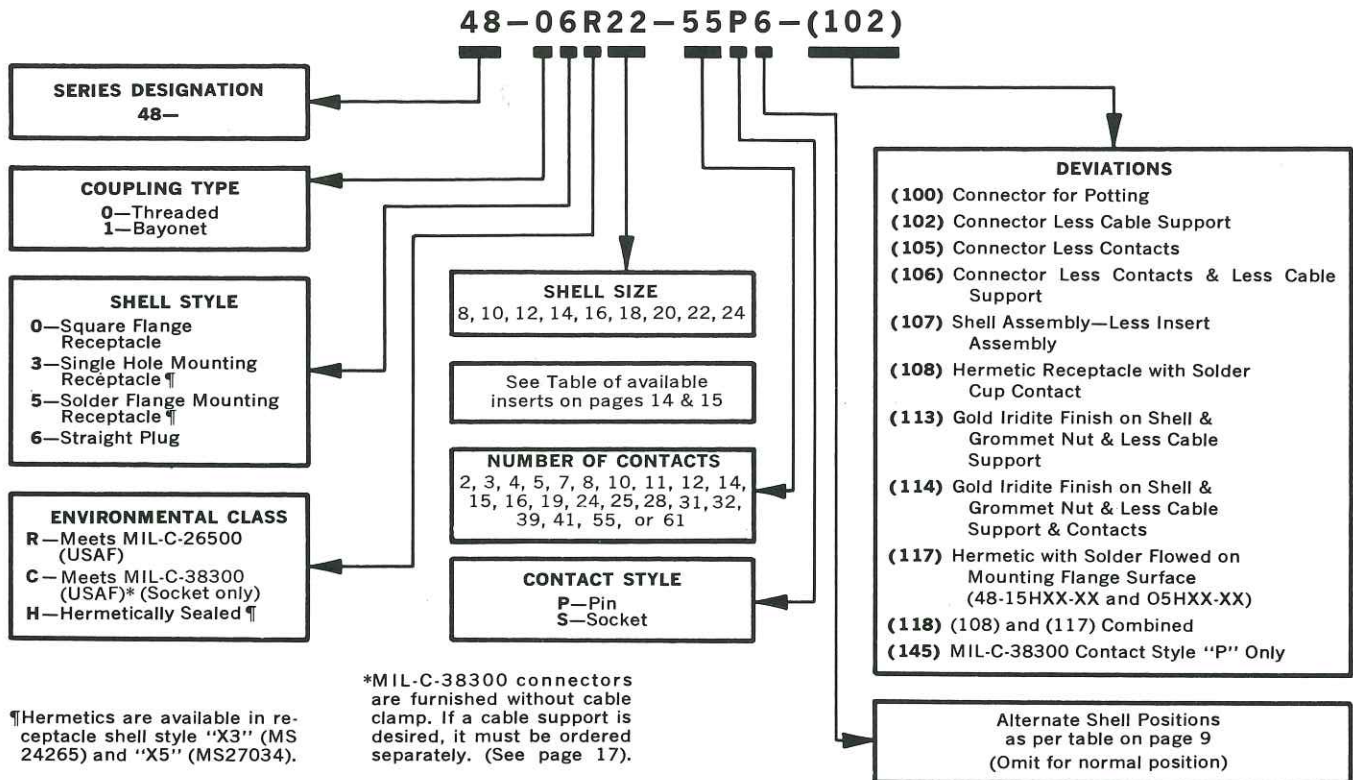
As a result, threaded-coupling 48 series connectors utilize a positive metal-to-metal shoulder for vibration damping instead of relying solely on the ability of the connector insert to absorb vibration.



AMPHENOL

How to Order 48 Series Connectors

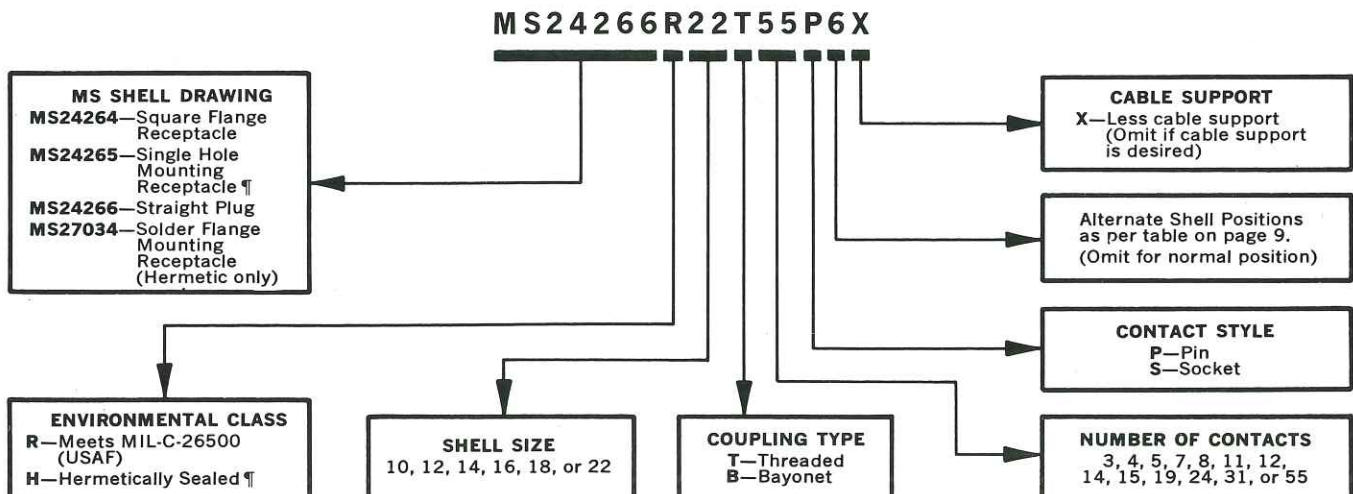
To get the specific 48 Series connector you want, put together the part number as per the following typical example. (Remember, of course, that only the inserts shown on page 12 are available.)



MILITARY STANDARD PART NUMBERS

You can use MS as well as AMPHENOL part numbers in ordering 48 Series connectors. The MS part numbers for MIL-C-26500 connectors are worked out on the basis shown in the table below. Whether you order by the MS or the 48 Series number, all qualified connectors are shipped with the MS marking.

The part numbers for MIL-C-38300 connectors start off with the identification M38300/ and take the form M38300/XXXX-XX. To determine the specific M numbers, refer to military specification MIL-C-38300.



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